TOSHIBA

FILE NO. A05-018

INSTALLATION MANUAL

SUPER

SUPER HEAT RECOVERY MULTI

HFC

R410A

Heat Recovery Type (2 Series)

Indoor Unit

<4-way Air Discharge Cassette Type>

MMU-AP0091H, AP0121H, AP0151H,
MMU-AP0181H, AP0241H, AP0271H,
MMU-AP0301H, AP0361H, AP0481H
MMU-AP0561H

<2-way Air Discharge Cassette Type>

MMU-AP0071WH, AP0091WH, AP0121WH,
MMU-AP0151WH, AP0181WH, AP0241WH,
MMU-AP0271WH, AP0301WH, AP0481WH*

*** CHINA market only**

<1-way Air Discharge Cassette Type>

MMU-AP0071YH, AP0091YH, AP0121YH,
MMU-AP0151SH, AP0181SH, AP0241SH

<Concealed Duct Standard Type>

MMD-AP0071BH, AP0091BH, AP0121BH,
MMD-AP0151BH, AP0181BH, AP0241BH,
MMD-AP0271BH, AP0301BH, AP0361BH,
MMD-AP0481BH, AP0561BH

<Concealed Duct High Static Pressure Type>

MMD-AP0181H, AP0241H, AP0271H,
MMD-AP0361H, AP0481H, AP0721H,
MMD-AP0961H

<Under Ceiling Type>

MMC-AP0151H, AP0181H, AP0241H,
MMC-AP0271H, AP0361H, AP0481H

<High Wall Type>

MMK-AP0071H, AP0091H, AP0121H,
MMK-AP0151H, AP0181H, AP0241H,
MMK-AP0072H*, AP0092H*, AP0122H*

*** European market only**

<Floor Standing Cabinet Type>

MML-AP0071H, AP0091H, AP0121H,
MML-AP0151H, AP0181H, AP0241H

<Floor Standing Concealed Type>

MML-AP0071BH, AP0091BH, AP0121BH,
MML-AP0151BH, AP0181BH, AP0241BH

<Floor Standing Type>

MMF-AP0151H, AP0181H, AP0241H
MMF-AP0271H, AP0361H, AP0481H
MMF-AP0561H

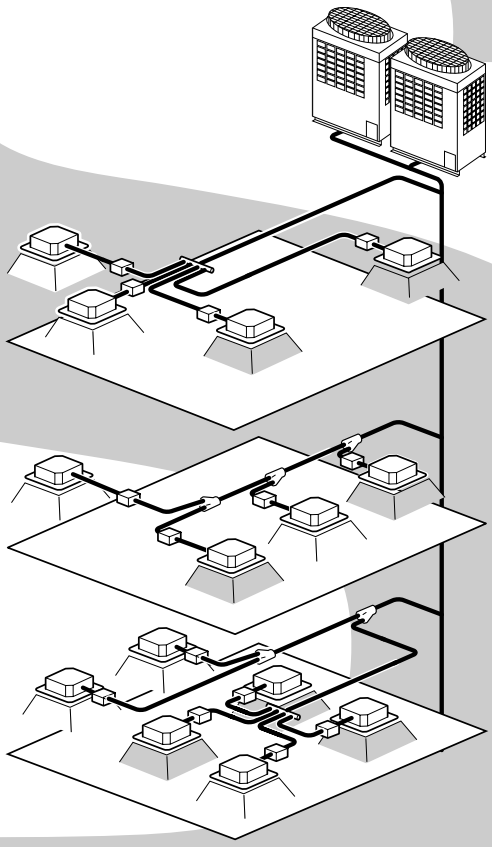
Outdoor Unit

<Inverter Unit>

MMY-MAP0802FT8
MMY-MAP1002FT8
MMY-MAP1202FT8

FS unit

RBM-Y1122FE
RBM-Y1802FE
RBM-Y2802FE



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WARNINGS ON REFRIGERANT LEAKAGE

Check of Concentration Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit.

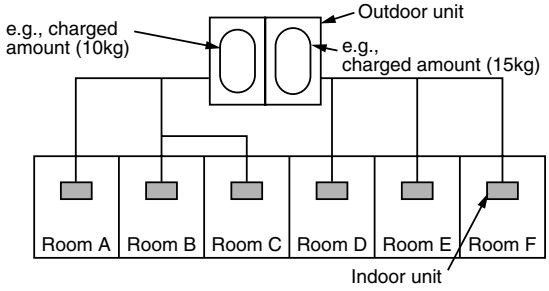
The refrigerant R410A which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively. Suffocation from leakage of R410A is almost non-existent. With the recent increase in the number of high concentration buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc.
Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared with conventional individual air conditioners. If a single unit of the multi conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).
In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device.
The concentration is as given below.

$$\frac{\text{Total amount of refrigerant (kg)}}{\text{Min. volume of the indoor unit installed room (m}^3\text{)}} \leq \text{Concentration limit (kg/m}^3\text{)}$$

The concentration limit of R410A which is used in multi air conditioners is 0.3kg/m³.
(For details, refer and comply with local regulations.)

NOTE 1 :

If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant should be as charged in each independent device.



For the amount of charge in this example:

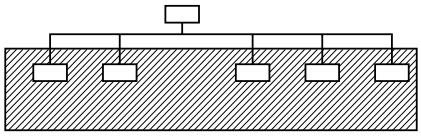
The possible amount of leaked refrigerant gas in rooms A, B and C is 10kg.
The possible amount of leaked refrigerant gas in rooms D, E and F is 15kg.

Important

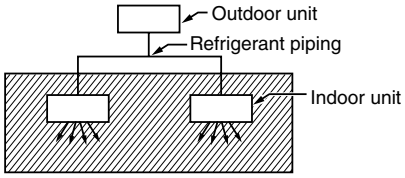
NOTE 2 :

The standards for minimum room volume are as follows.

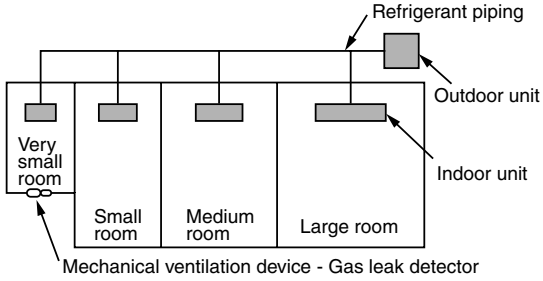
(1) No partition (shaded portion)



(2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).

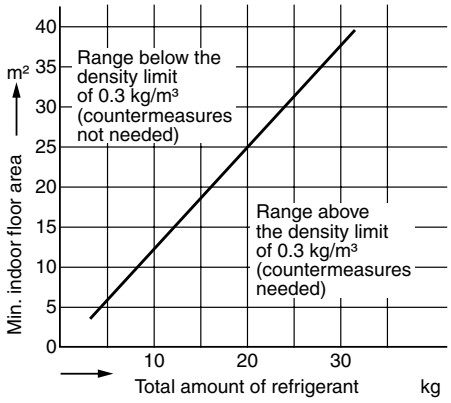


(3) If an indoor unit is installed in each partitioned room and the refrigerant piping is interconnected, the smallest room of course becomes the object. But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



NOTE 3 :

The minimum indoor floor area compared with the amount of refrigerant is roughly as follows:
(When the ceiling is 2.7m high)



NOTE

A direct current motor is adopted for indoor fan motor in the Concealed Duct Standard Type air conditioner. Caused from its characteristics, a current limit works on the direct current motor. When replacing the high-performance filter or when opening the service board, be sure to stop the fan. If an above action is executed during the fan operation, the protective control works to stop the unit operation, and the check code "P12" may be issued. However it is not a trouble. When the desired operation has finished, be sure to reset the system to clear "P12" error code using the leak breaker of the indoor unit. Then push the operation stop button of the remote controller to return to the usual operation.

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CAUTION **New Refrigerant Air Conditioner Installation**

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.**

The characteristics of R410A refrigerant are ; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

1. SELECTING A LOCATION FOR INSTALLATION

⚠ WARNING

Install the air conditioner certainly at a location to sufficiently withstand the weight.

If the strength is insufficient, the unit may fall down resulting in human injury.

Perform a specified installation work to guard against a great wind such as typhoon or an earth quake.

An incomplete installation can cause accidents by the units failing and dropping.

The following models must be installed at height 2.5m or more from the floor. (Concealed type duct type and cassette type air conditioners)

If you insert your hands or others directly into the unit while the air conditioner operates, it is dangerous because you may contact with revolving fan or active electricity.

Installation Location Selection for Outdoor unit

Obtain permission from the customer to install the unit in a location that satisfies the following requirements :

- A location that permits level installation of the unit.
- A location that provides enough space to service the unit safety
- A location where water draining from the unit will not pose a problem

Avoid installing in the following places.

- Place exposed to air with high salt content (seaside area), or place exposed to large quantities of sulfide gas (hot spring). (Should the unit be used in these places, special protective measures are needed.)
- Place exposed to oil, vapor, oil smoke or corrosive gas.
- Place where organic solvent is used nearby.
- Place close to a machine generating high frequency.
- Place where the discharged air blows directly into the window of the neighboring house. (For outdoor unit)
- Place where noise of the outdoor unit is easily transmitted.
  (When installing the air conditioner on the boundary with the neighbor, pay due attention to the level of noise.)
- Place with poor ventilation.
  (Especially in Concealed duct type indoor unit, before air ducting work, check whether value of air volume, static pressure and duct resistance are correct.)

Equipments

1. Outdoor units

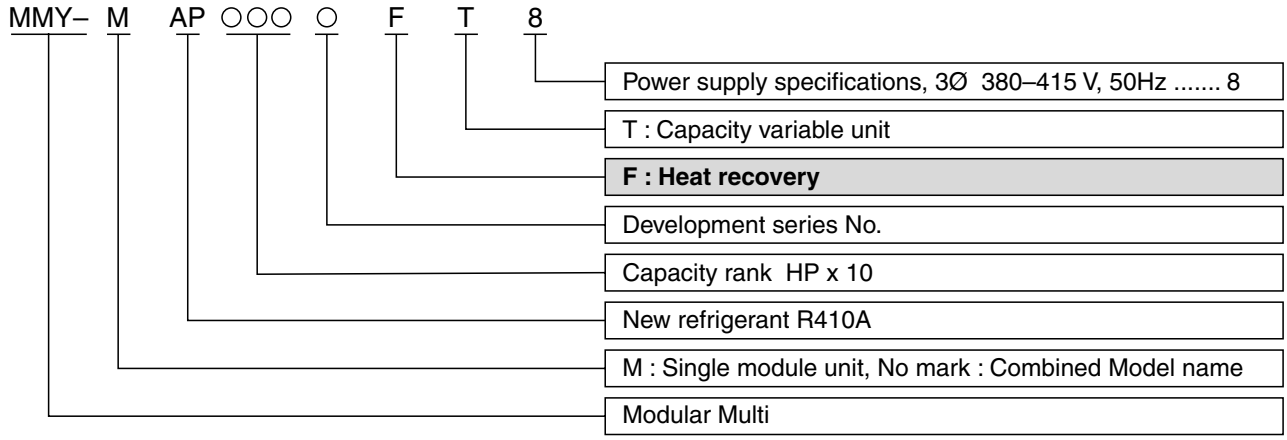
Corresponding HP	Inverter unit			Appearance
	8 HP	10 HP	12 HP	
Model name MMY-	MAP0802FT8	MAP1002FT8	MAP1202FT8	
Cooling capacity (kW)	22.4	28.0	33.5	
Heating capacity (kW)	25.0	31.5	35.5	

2. Outdoor units (Combination of outdoor units)

Corresponding HP		8HP	10HP	12HP	16HP	18HP
Combined model	MMY-	MAP0802FT8	MAP1002FT8	MAP1202FT8	AP1602FT8	AP1802FT8
Cooling capacity (kW)		22.4	28	33.5	45	50.4
Heating capacity (kW)		25	31.5	35.5	50	56.5
Combined outdoor units		8HP	10HP	12HP	8HP	10HP
					8HP	8HP
No. of connectable indoor units		13	16	16	27	30

Corresponding HP		20HP	24HP	26HP	28HP	30HP
Combined model	MMY-	AP2002FT8	AP2402FT8	AP2602FT8	AP2802FT8	AP3002FT8
Cooling capacity (kW)		56	68	73	78.5	84
Heating capacity (kW)		63	76.5	81.5	88	95
Combined outdoor units		10HP	8HP	10HP	10HP	10HP
		10HP	8HP	8HP	10HP	10HP
			8HP	8HP	8HP	10HP
No. of connectable indoor units		33	40	43	47	48

Allocation standard of model name

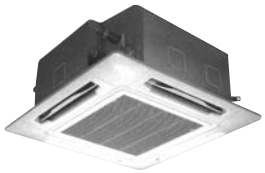

MMY– M AP ○○○ ○ F T 8
Power supply specifications, 3Ø 380–415 V, 50Hz 8
T : Capacity variable unit
F : Heat recovery
Development series No.
Capacity rank HP x 10
New refrigerant R410A
M : Single module unit, No mark : Combined Model name
Modular Multi

3. FS units (Flow selector units)

Model name	Inverter unit	Appearance
RBM-Y1122FE	Total capacity for indoor unit : below 11.2kW	
RBM-Y1802FE	Total capacity for indoor unit : 11.2 to below 18.0kW	
RBM-Y2802FE	Total capacity for indoor unit : 18.0 to 28.0kW or less	

* Accessory part : Connection cable kit (RBC-CBK15FE), up to 15m.

3. Indoor units

Type	Appearance	Model name	Capacity rank	Capacity code	Cooling capacity (kW)	Heating capacity (kW)
4-way Air Discharge Cassette Type		**MMU-AP0091H**	009 type	1	2.8	3.2
		MMU-AP0121H	012 type	1.25	3.6	4.0
		MMU-AP0151H	015 type	1.7	4.5	5.0
		MMU-AP0181H	018 type	2	5.6	6.3
		MMU-AP0241H	024 type	2.5	7.1	8.0
		MMU-AP0271H	027 type	3	8.0	9.0
		MMU-AP0301H	030 type	3.2	9.0	10.0
		MMU-AP0361H	036 type	4	11.2	12.5
		MMU-AP0481H	048 type	5	14.0	16.0
		MMU-AP0561H	056 type	6	16.0	18.0
2-way Air Discharge Cassette Type		**MMU-AP0071WH**	007 type	0.8	2.2	2.5
		MMU-AP0091WH	009 type	1	2.8	3.2
		MMU-AP0121WH	012 type	1.25	3.6	4.0
		MMU-AP0151WH	015 type	1.7	4.5	5.0
		MMU-AP0181WH	018 type	2	5.6	6.3
		MMU-AP0241WH	024 type	2.5	7.1	8.0
		MMU-AP0271WH	027 type	3	8.0	9.0
		MMU-AP0301WH	030 type	3.2	9.0	10.0
		MMU-AP0481WH*1)	048 type	5	14.0	16.0
1-way Air Discharge Cassette Type		**MMU-AP0071YH**	007 type	0.8	2.2	2.5
		MMU-AP0091YH	009 type	1	2.8	3.2
		MMU-AP0121YH	012 type	1.25	3.6	4.0
		MMU-AP0151SH	015 type	1.7	4.5	5.0
		MMU-AP0181SH	018 type	2	5.6	6.3
		MMU-AP0241SH	024 type	2.5	7.1	8.0
Concealed Duct Standard Type		**MMD-AP0071BH**	007 type	0.8	2.2	2.5
		MMD-AP0091BH	009 type	1	2.8	3.2
		MMD-AP0121BH	012 type	1.25	3.6	4.0
		MMD-AP0151BH	015 type	1.7	4.5	5.0
		MMD-AP0181BH	018 type	2	5.6	6.3
		MMD-AP0241BH	024 type	2.5	7.1	8.0
		MMD-AP0271BH	027 type	3	8.0	9.0
		MMD-AP0301BH	030 type	3.2	9.0	10.0
		MMD-AP0361BH	036 type	4	11.2	12.5
		MMD-AP0481BH	048 type	5	14.0	16.0
		MMD-AP0561BH	056 type	6	16.0	18.0
Concealed Duct High Static Pressure Type		**MMD-AP0181H**	018 type	2	5.6	6.3
		MMD-AP0241H	024 type	2.5	7.1	8.0
		MMD-AP0271H	027 type	3	8.0	9.0
		MMD-AP0361H	036 type	4	11.2	12.5
		MMD-AP0481H	048 type	5	14.0	16.0
		MMD-AP0721H	072 type	8	22.4	25.0
		MMD-AP0961H	096 type	10	28.0	31.5
Under Ceiling Type		**MMC-AP0151H**	015 type	1.7	4.5	5.0
		MMC-AP0181H	018 type	2	5.6	6.3
		MMC-AP0241H	024 type	2.5	7.1	8.0
		MMC-AP0271H	027 type	3	8.0	9.0
		MMC-AP0361H	036 type	4	11.2	12.5
		MMC-AP0481H	048 type	5	14.0	16.0
High Wall Type (1 Series)		**MMK-AP0071H**	007 type	0.8	2.2	2.5
		MMK-AP0091H	009 type	1	2.8	3.2
		MMK-AP0121H	012 type	1.25	3.6	4.0
		MMK-AP0151H	015 type	1.7	4.5	5.0
		MMK-AP0181H	018 type	2	5.6	6.3
		MMK-AP0241H	024 type	2.5	7.1	8.0
High Wall Type (2 Series) *2)		**MMK-AP0072H**	007 type	0.8	2.2	2.5
		MMK-AP0092H	009 type	1.0	2.8	3.2
		MMK-AP0122H	012 type	1.25	3.6	4.0
Floor Standing Cabinet Type		**MML-AP0071H**	007 type	0.8	2.2	2.5
		MML-AP0091H	009 type	1	2.8	3.2
		MML-AP0121H	012 type	1.25	3.6	4.0
		MML-AP0151H	015 type	1.7	4.5	5.0
		MML-AP0181H	018 type	2	5.6	6.3
		MML-AP0241H	024 type	2.5	7.1	8.0
Floor Standing Concealed Type		**MML-AP0071BH**	007 type	0.8	2.2	2.5
		MML-AP0091BH	009 type	1	2.8	3.2
		MML-AP0121BH	012 type	1.25	3.6	4.0
		MML-AP0151BH	015 type	1.7	4.5	5.0
		MML-AP0181BH	018 type	2	5.6	6.3
		MML-AP0241BH	024 type	2.5	7.1	8.0
Floor Standing Type		**MMF-AP0151H**	015 type	1.7	4.5	5.0
		MMF-AP0181H	018 type	2	5.6	6.3
		MMF-AP0241H	024 type	2.5	7.1	8.0
		MMF-AP0271H	027 type	3	8.0	9.0
		MMF-AP0361H	036 type	4	11.2	12.5
		MMF-AP0481H	048 type	5	14.0	16.0
		MMF-AP0561H	056 type	6	16.0	18.0

***1) China market only** ***2) European market only**

Tools

Required Tools

The used refrigerating oil is changed, and mixing of oil may cause a trouble such as generation of sludge, clogging of capillary, etc. Accordingly, the tools to be used are classified into the following three types.

(1) Tools exclusive for R410A (Those which cannot be used for conventional refrigerant (R22))

(2) Tools exclusive for R410A, but can be also used for conventional refrigerant (R22)

(3) Tools commonly used for R410A and for conventional refrigerant (R22)

The table below shows the tools exclusive for R410A and their interchangeability.

Tools exclusive for R410A (The following tools for R410A are required.)

Tools whose specifications are changed for R410A and their interchangeability

No.	Used tool	Usage	R410A air conditioner installation		Conventional air conditioner installation
			Existence of new equipment for R410A	Whether conventional equipment can be used	Whether new equipment can be used with conventional refrigerant
①	Flare tool	Pipe flaring	Yes	*(Note 1)	○
②	Copper pipe gauge for adjusting projection margin	Flaring by conventional flare tool	Yes	*(Note 1)	*(Note 1)
③	Torque wrench	Connection of flare nut	Yes	×	×
④	Gauge manifold	Evacuating, refrigerant charge, run check, etc.	Yes	×	×
⑤	Charge hose				
⑥	Vacuum pump adapter	Vacuum evacuating	Yes	×	○
⑦	Electronic balance for refrigerant charging	Refrigerant charge	Yes	Yes	○
⑧	Refrigerant cylinder	Refrigerant charge	Yes	×	×
⑨	Leakage detector	Gas leakage check	Yes	×	○
⑩	Charging cylinder	Refrigerant charge	(Note 2)	×	×

(Note 1) When flaring is carried out for R410A using the conventional flare tools, adjustment of projection margin is necessary. For this adjustment, a copper pipe gauge, etc. are necessary.

(Note 2) Charging cylinder for R410A is being currently developed.

General tools (Conventional tools can be used.)

In addition to the above exclusive tools, the following equipments which serve also for R22 are necessary as the general tools.

(1) Vacuum pump
Use vacuum pump by attaching vacuum pump adapter.

(2) Torque wrench

(3) Pipe cutter

(4) Reamer

(5) Pipe bender

(6) Level vial

(7) Screwdriver (+, –)

(8) Spanner or Monkey wrench

(9) Hole core drill

(10) Hexagon wrench (Opposite side 4mm)

(11) Tape measure

(12) Metal saw

Also prepare the following equipments for other installation method and run check.

(1) Clamp meter

(2) Thermometer

(3) Insulation resistance tester

(4) Electroscope

2. SAFETY NOTES

- Ensure that all Local, National and International regulations are satisfied.
- Read this “SAFETY NOTES” carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
  Follow the Owner’s Manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner’s Manual.

⚠ WARNING

- **Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.**
  Inappropriate installation may result in water leakage, electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**
  Make sure all power switches are off. Failure to do so may cause electric shock.
- **Connect the connecting wire correctly.**
  If the connecting wire is connected in a wrong way, electric parts may be damaged.
- **When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.**
  If air or any other gas is mixed in the refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it as a result causes pipe burst and injuries on persons.
- **Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.**
- **Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts.**
  Do not store it in a wet basement or expose to rain or water.
- **After unpacking the unit, examine it carefully if there are possible damage.**
- **Do not install in a place that might increase the vibration of the unit.**
- **To avoid personal injury (with sharp edges), be careful when handling parts.**
- **Perform installation work properly according to the Installation Manual.**
  Inappropriate installation may result in water leakage, electric shock or fire.
- **When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.**
- **Install the air conditioner securely in a location where the base can sustain the weight adequately.**
- **Perform the specified installation work to guard against an earthquake.**
  If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- **If refrigerant gas has leaked during the installation work, ventilate the room immediately.**
  If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- **After the installation work, confirm that refrigerant gas does not leak.**
  If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
- **Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.**
  An insufficient power supply capacity or inappropriate installation may cause fire.
- **Use the specified wires for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.**
- **Conform to the regulations of the local electric company when wiring the power supply.**
  Inappropriate grounding may cause electric shock.
- **Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.**
  If a combustible gas leaks, and stays around the unit, a fire may occur.

3. CHECK POINTS

Check before operation

- Turn on the main power switch 12 hours or more before starting the operation.
- Check whether earth wire is disconnected or out of place.
- Check that air filter is installed to the indoor unit.

Heating capacity

- For heating operation, a heat pump type which absorbs the outdoor heat and deliver the heat in the room is adopted. If the outdoor temperature lowers, the heating capacity decreases.
- When the outdoor temperature is low, common use with other heating devices is recommended.

Defrost operation in heating operation

- If frost is found on the outdoor unit during heating operation, the defrost operation starts automatically (for approx. 2 to 10 minutes) so as to increase the heating effect.
- During defrost operation, the fans of both indoor and outdoor units stop.

Protection for 3 minutes

- The outdoor unit does not operate for approx. 3 minutes after air conditioner has been immediately restarted after stop, or power switch has been turned on. This is to protect the system.

Main power failure

- If a power failure occurs during operation, all operations stop.
- When the power is turned on after power failure, the operation lamp of the remote controller flashes to notify.
- When restarting the operation, push ON/OFF button again.

Fan rotation of stopped unit

- While other indoor units operate, the fan on indoor units on “stand-by” rotates to protect the machine once per approx. 1 hour for several minutes.

Protective device (High pressure switch)

The high pressure switch operate the air conditioner automatically stops when excessive load is applied to the air conditioner. If the protective device works, the operation lamp keeps lit but the operation stops.
When the protective device works, “CHECK” characters in the remote controller display section flash.
The protective device may work in the following cases.

Cooling

- When air inlet or outlet of the outdoor unit is closed.
- When strong wind blows continuously against air outlet of the outdoor unit.

Heating

- When much dust or dirt is excessively adhered to air filter of the indoor unit.
- When air outlet of the indoor unit is blocked.

NOTE

If the protective device works, turn off the main power switch, remove the cause, and then restart the operation.

Cooling/ heating operation of Multi system air conditioner

- When COOL or HEAT mode is fixed by the manager of the air conditioner, other operation than the set mode is unavailable. If other operation than the set mode has been performed, [PRE-HEAT] or [Operation ready] on the operation part goes on and the operation stops.

Operating temperature of Super HRM

- When outdoor temperature goes out of specified range, “ or ” mark is indicated on the remote controller display and required operation will stop. “ & ” : When heating operation. “ ” : When cooling operation.

  [Notice]
  - This indication is not failure.
  - When outdoor temperature goes back to specified range, “ or ” disappear and start normal operation.
  - Operation stops because concurrent operation can not be kept in the condition of out of specification for Super HRM. (Outdoor temp. (DB) < –10°C : Cooling, > 21°C : Heating)
- Do not use “Super HRM” for other than personal usage where the ambient temperature may go down below –10°C. (For example, OA equipment/Electric device/Food/Animals and plants/Art object)

Characteristics of heating operation

- Air does not blow out immediately after start of the operation. When the indoor heat exchanger has been heated after 3 to 5 minutes passed (differs according to temperature of indoor/outdoor temperature), hot air starts blowing.
- During operation, the outdoor unit may stop when outdoor temperature becomes high.
- When other indoor unit performs heating operation during fan operation, fan operation may be stopped temporarily to prevent discharge of hot air.

4. KEY POINTS OF AIR CONDITIONER INSTALLATION

In order to prevent problems before they arise, carefully read (1) the Installation Manual provided with the equipment, and (2) the Owner's Manual before installing the air conditioner.

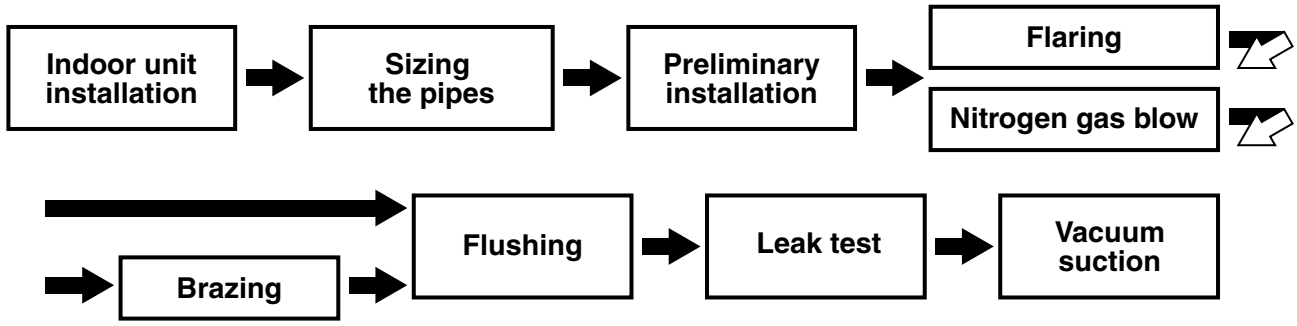
4-1. Flow of Air Conditioner Installation Work

[Step]	[Key Points]
(Prior to Installation)	
Determination of extent of installation work	Clearly determine the extent of the installation work.
Drafting of diagrams	Draft : • Control wiring system diagram • Refrigerant line system diagram • Power wiring system diagram
(Installation)	
Sleeve/insert installation	Pay careful attention to the downward slope of the drain pipe.
Indoor unit and flow selector unit installation	Be sure to check the name of the model in order to avoid any installation mistakes. If the model has an installation pattern, attach the pattern to the ceiling to mark the position of the ceiling openings and to keep dust away.
Refrigerant pipe installation	Make sure that the pipe system is dry, clean, and airtight. When brazing pipes, blow out the system with nitrogen gas. Do not forget the system indications.
(to outdoor outlet)	
Drain pipe installation	Pipes should have downward slope (of at least 1/100).
Duct installation	Make sure the duct is large enough to carry the desired volume of air. Be careful not to make any errors in the external static pressure calculations.
Insulation work	Be especially careful to close off all gaps where connections are made to the indoor unit, and at joints in the branching kit. Do not forget the drain pipes.
Electrical work (control wires and power wires)	Use two-core shielded wires for the control wires, and use separate power supplies for the indoor and outdoor units. For connecting the flow selector unit, be sure to use the attached cable or connection cable kit sold separately.
Various switch settings	Set the switches correctly, as indicated in the control wiring system diagram.
Outdoor unit base installation	Make sure that the base is level.
Outdoor unit installation	Provide for adequate air flow and service space around the outdoor unit. Indicate the system names clearly.
Outside circulation, refrigerant pipe installation	From outside outlet to outdoor unit.
Gas-leak test	In the final test, the system must be pressurized at 3.73MPa (38kg/cm²G) for 24 hours with no decrease in pressure.
Vacuum suction	Use a vacuum pump with reverse flaw prevention adaptor with a large output volume and that can achieve a high level of vacuum.
Addition of refrigerant	Record the amount of refrigerant that was added to the system on both the outdoor unit and on the pre-test operation checklist.
Ceiling panel installation	Make sure that the ceiling panel is attached to the ceiling material tightly, with no gaps.
Test operation and adjustment	Operate the indoor units one by one, making sure that all wiring and pipes are connected correctly, and fill out the checklist.
Owner's Manual transfer	Explain how to operate the system clearly and concisely.

The procedure described above presents only the general sequence of steps; the sequence of steps may have to be altered according to the circumstances of any specific installation job.

5. REFRIGERANT PIPE INSTALLATION

5-1. Work Procedure

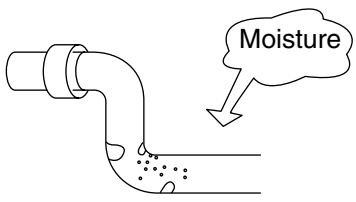
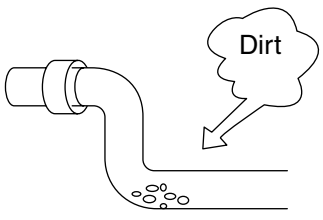
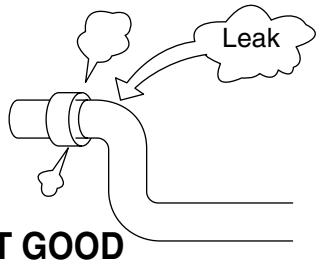


5-2. Three Principles of Refrigerant Pipes

<Observe the three principles of refrigerant pipes>

	Causes of Problems	Preventing Problems
Dry	• Moisture (in the form of rainwater or water used during installation, for example) getting inside of the pipes • Moisture from condensation forming or seeping into the pipes	**Careful handling of pipes** → **Flushing** → **Vacuum suction**
Clean	• Oxidation inside pipes during brazing • Dirt, dust, or foreign matter getting inside pipes	**Nitrogen gas blow** **Careful handling of pipes** → **Flushing**
Air-tight	• Poor brazing • Poor flaring	**Use of suitable materials (copper pipes, solder, etc.)** **Perform basic work of brazing carefully** **Perform basic work of flaring carefully** → **Leak test**

<Three principles of refrigerant pipes>

Dry	Clean	Airtight
Make sure there is no moisture inside of the pipes	**Make sure there is no dirt inside of the pipes**	**Make sure the refrigerant does not leak**
 **NOT GOOD**	 **NOT GOOD**	 **NOT GOOD**

5-3. Selecting the Refrigerant Line Material

• Refrigerant pipes

- **Material: Phosphoric deoxidized seam-less pipe**
- **Capacity code of outdoor unit / indoor unit**
  - For each indoor unit, the capacity code is determined for every capacity rank.
  - For each outdoor unit, the capacity code is determined for every capacity rank. The Max. number of the connectable indoor units and the total capacity code value of the indoor units are also determined.

Against the capacity code of the outdoor unit, the total capacity codes of the connectable indoor units differ according to the height difference between indoor units.

- When the height difference between indoor units is 15m or less : Up to 135%* of capacity code of outdoor unit (* For 12HP system, up to 120%.)
- When the height difference between indoor units is above 15m : Up to 105% of capacity code of outdoor unit

Table 1

Indoor unit capacity rank	Capacity code	
	Equivalent to HP	Equivalent to capacity
007 type	0.8	2.2
009 type	1	2.8
012 type	1.25	3.6
015 type	1.7	4.5
018 type	2	5.6
024 type	2.5	7.1
027 type	3	8
030 type	3.2	9
036 type	4	11.2
048 type	5	14
056 type	6	16
072 type	8	22.4
096 type	10	28.0

Table 2

Outdoor unit model name	Capacity code		No. of indoor units	Total capacity code of connectable indoor units	
				Min	Max.
	Equivalent to HP	Equivalent to capacity		Equivalent to HP	Equivalent to HP
MMY-MAP0802FT8	8	22.4	13	5.6	10.8
MMY-MAP1002FT8	10	28.0	16	7.0	13.5
MMY-MAP1202FT8	12	33.5	16	8.4	14.4
MMY-AP1602FT8	16	45.0	27	11.2	21.6
MMY-AP1802FT8	18	50.4	30	12.6	24.3
MMY-AP2002FT8	20	56.0	33	14.0	27.0
MMY-AP2402FT8	24	68.0	40	16.8	32.4
MMY-AP2602FT8	26	73.0	43	18.2	35.1
MMY-AP2802FT8	28	78.5	47	19.6	37.8
MMY-AP3002FT8	30	84.0	48	21.0	40.5

Table 3

No.	Piping parts	Name	Selection of pipe size
①	Outdoor unit ↓ T-shape branching joint	Connecting pipe of outdoor unit	1) Connecting pipe outdoor unit

Model name	Suction gas side	Discharge gas side	Liquid side
MMY-MAP0802FT8	Ø22.2	Ø19.1	Ø12.7
MMY-MAP1002 FT8	Ø22.2	Ø19.1	Ø12.7
MMY-MAP1202 FT8	Ø28.6	Ø19.1	Ø12.7

② Between T-shape branching joints — Main connecting piping between of outdoor units / Balance pipe

2) Pipe size for connecting piping between outdoor units

Total capacity codes of outdoor units at downstream side		Suction gas side	Discharge gas side	Liquid side	Balance pipe
Equivalent to capacity	Equivalent to HP				
Below 61.5	Below 22	Ø28.6	Ø22.2	Ø15.9	Ø9.5

③ T-shape joint of header unit ↓ 1st branching section — Main pipe

3) Size of main pipe

Total capacity codes of all outdoor units		Suction gas side	Discharge gas side	Liquid side
Equivalent to capacity	Equivalent to HP			
Below 33.5	Below 12	Ø22.2	Ø19.1	Ø12.7
33.5	12	Ø28.6	Ø 19.1	Ø12.7
45.0 to below 61.5	16 to below 22	Ø28.6	Ø22.2	Ø19.1
61.5 to below 73.0	22 to below 26	Ø34.9	Ø28.6	Ø19.1
73.0 or more	26 or more	Ø34.9	Ø28.6	Ø22.2

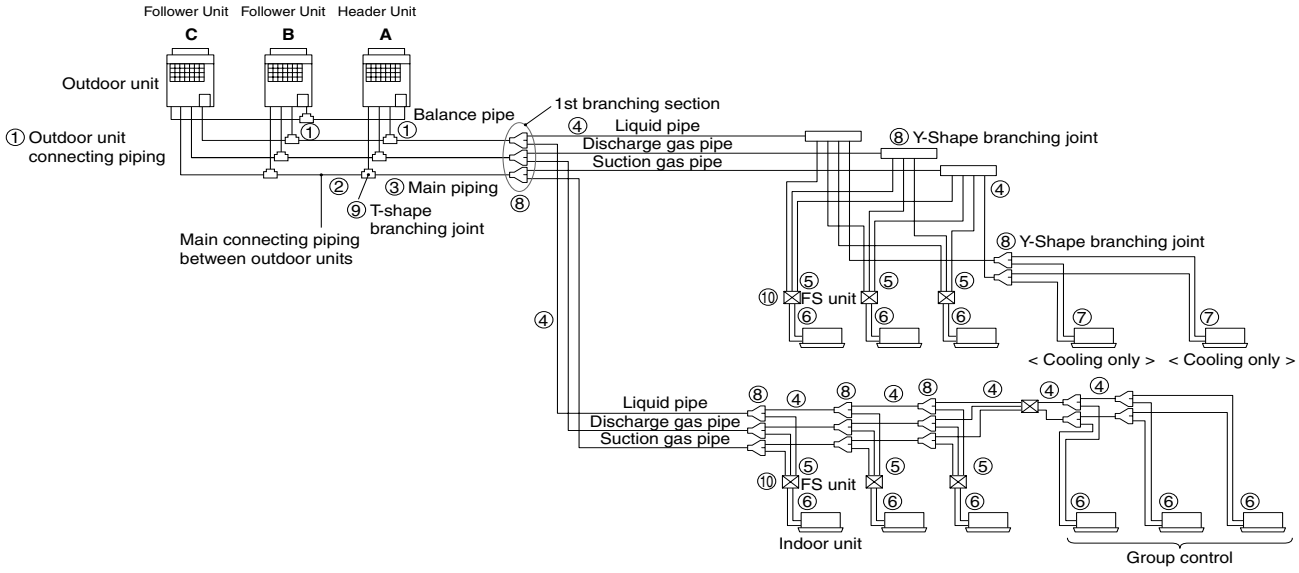
④ Branching section ↓ Branching section — Branching pipe

4) Pipe size between branching sections

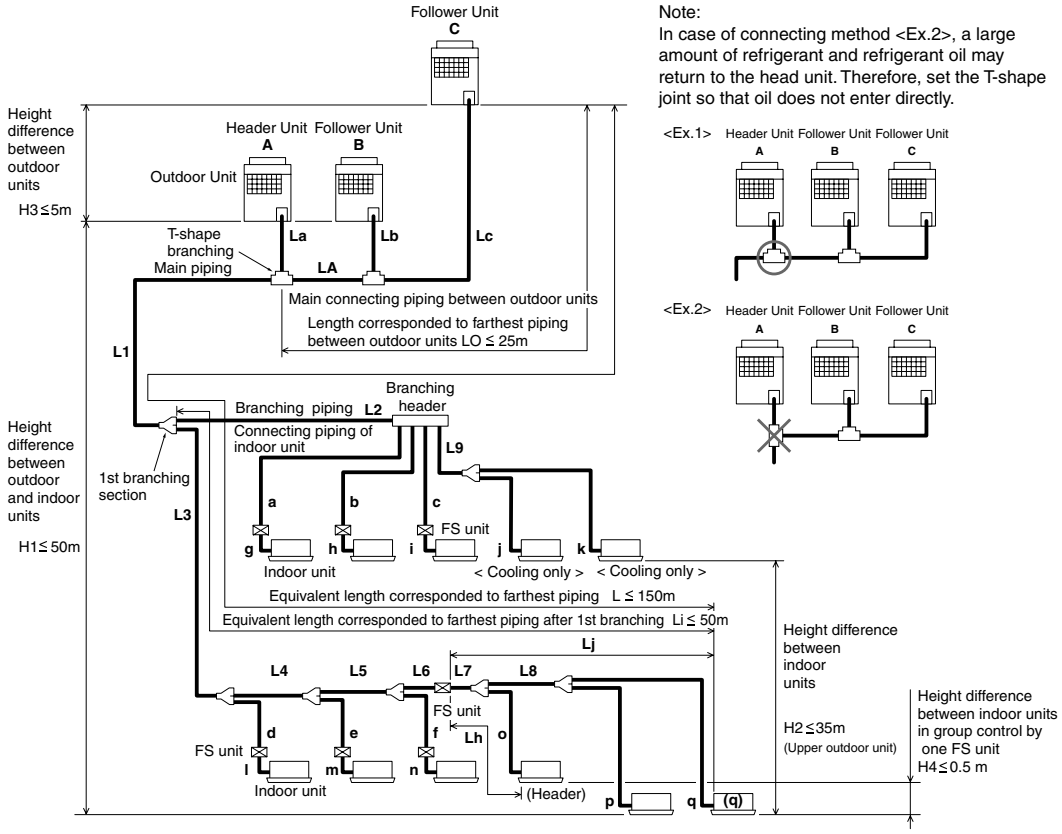
Total capacity codes of indoor units at downstream side		Suction gas side	Discharge gas side	Liquid side
Equivalent to capacity	Equivalent to HP			
Below 18.0	Below 6.4	Ø15.9	Ø12.7	Ø9.5
18.0 to below 34.0	6.4 to below 12.2	Ø22.2	Ø19.1	Ø12.7
34.0 to below 56.5	12.2 to below 20.2	Ø28.6	Ø22.2	Ø15.9
56.5 to below 70.5	20.2 to below 25.2	Ø34.9	Ø28.6	Ø15.9
70.5 or more	25.2 or more	Ø34.9	Ø28.6	Ø19.1

* If exceeding the main pipe size, decide the size same to main pipe size.
* When two pipes are used for the circuits exclusive to cooling, use pipes at liquid and suction gas sides.
* 2 pipes from FS unit to branching section shall be used with liquid pipe and suction gas pipe.

<table>
<tr><th>No.</th><th>Piping parts</th><th>Name</th><th>Selection of pipe size</th></tr>
<tr><td>⑤</td><td>End branching section
↓
Flow selector unit</td><td>Connecting pipe of flow selector unit</td><td>5) Pipe size between end branching section and flow selector unit
<table>
<tr><th colspan="2">Total capacity codes of indoor units at downstream side</th><th rowspan="2">Suction gas side</th><th rowspan="2">Discharge gas side</th><th rowspan="2">Liquid side</th></tr>
<tr><th>Equivalent to capacity</th><th>Equivalent to HP</th></tr>
<tr><td>Below 18.0</td><td>Below 6.4</td><td>Ø15.9</td><td>Ø12.7</td><td>Ø9.5</td></tr>
<tr><td>18.0 or more</td><td>6.4 or more</td><td>Ø22.2</td><td>Ø19.1</td><td>Ø12.7</td></tr>
</table></td></tr>
<tr><td>⑥</td><td>Branching section or flow selector unit
↓
Indoor unit</td><td>Connecting pipe of indoor unit</td><td>6) Connecting pipe size of indoor unit
<table>
<tr><th>Capacity rank</th><th>Gas side</th><th>Liquid side</th></tr>
<tr><td>007 to 012 type</td><td>Ø9.5</td><td rowspan="2">Ø6.4</td></tr>
<tr><td>015 to 018 type</td><td>Ø12.7</td></tr>
<tr><td>024 to 056 type</td><td>Ø15.9</td><td>Ø9.5</td></tr>
<tr><td>072 to 096 type</td><td>Ø22.2</td><td>Ø12.7</td></tr>
</table></td></tr>
<tr><td>⑦</td><td>Branching section</td><td>Piping of cooling only indoor unit (Between branching and indoor unit)</td><td>7) Connecting pipe size of cooling only indoor unit
<table>
<tr><th>Gas side</th><th>Liquid side</th><th colspan="2">Capacity rank of indoor unit</th></tr>
<tr><td>Ø9.5</td><td>Ø6.4</td><td>15m or less</td><td rowspan="2">007 to 012 Type</td></tr>
<tr><td>Ø12.7</td><td>Ø9.5</td><td>above 15m</td></tr>
<tr><td>Ø12.7</td><td>Ø6.4</td><td>15m or less</td><td rowspan="2">015 to 018 Type</td></tr>
<tr><td>Ø15.9</td><td>Ø9.5</td><td>above 15m</td></tr>
<tr><td>Ø15.9</td><td>Ø9.5</td><td colspan="2">024 to 056 Type</td></tr>
<tr><td>Ø22.2</td><td>Ø12.7</td><td colspan="2">072, 096 Type</td></tr>
</table>
∗ 2 pipes for cooling only indoor unit shall be used with liquid pipe and suction gas pipe.</td></tr>
<tr><td>⑧
⑨</td><td>Branching section</td><td>Branching header
Y-shape branching joint
T shape branching joint</td><td>8, 9) Selection of branching joint/header
<table>
<tr><th colspan="3" rowspan="2"></th><th colspan="2">Total capacity codes of indoor units</th><th colspan="2">Model name</th></tr>
<tr><th>Equivalent to capacity</th><th>Equivalent to HP</th><th>For 3 piping</th><th>For 2 piping</th></tr>
<tr><td rowspan="6">⑧</td><td rowspan="3">Y-Shape branching joint *1 *2</td><td></td><td>Below 18.0</td><td>Below 6.4</td><td>RBM-BY53FE</td><td>RBM-BY53E</td></tr>
<tr><td></td><td>18.0 to below 40.0</td><td>6.4 to below 14.2</td><td>RBM-BY103FE</td><td>RBM-BY103E</td></tr>
<tr><td></td><td>40.0 to below 70.5</td><td>14.2 to below 25.2</td><td>RBM-BY203FE</td><td>RBM-BY203E</td></tr>
<tr><td></td><td></td><td>70.5 or more</td><td>25.2 or more</td><td>RBM-BY303FE</td><td>RBM-BY303E</td></tr>
<tr><td rowspan="3">Branching Header *1, *2, *3</td><td>For 4 Branching</td><td>Below 40.0</td><td>Below 14.2</td><td>RBM-HY1043FE</td><td>RBM-HY1043E</td></tr>
<tr><td>For 4 Branching</td><td>40.0 to below 70.5</td><td>14.2 to below 25.2</td><td>RBM-HY2043FE</td><td>RBM-HY2043E</td></tr>
<tr><td>For 8 Branching</td><td>Below 40.0</td><td>Below 14.2</td><td>RBM-HY1083FE</td><td>RBM-HY1083E</td></tr>
<tr><td></td><td></td><td></td><td>40.0 to below 70.5</td><td>14.2 to below 25.2</td><td>RBM-HY2083FE</td><td>RBM-HY2083E</td></tr>
<tr><td>⑨</td><td colspan="2">T-Shape branching joint (For connecting outdoor unit)</td><td colspan="2">1 set of 4 types of T-shape joint pipes as described below : The rewired quantity is arranged and combined at the site.
- Balance pipe (Ø 9.52) X 1
- Piping at liquid side (Ø 12.7 to Ø 22.2) X 1
- Piping at discharge gas side (Ø 19.1 to Ø 28.6) X 1
- Piping at suction gas side (Ø 22.2 to Ø 38.1) X 1</td><td colspan="2">RBM-BT13FE</td></tr>
</table>
∗1 Branching pipe on the 1st branch should be selected according to the capacity code for outdoor unit.
∗2 In case total capacity code for indoor units shall be exceeded to capacity code for outdoor unit, the pipe size should be selected with capacity code for outdoor unit.
∗3 For 1 line after header branching, indoor units with a maximum of 6.0 capacity code in total can be connected.</td></tr>
<tr><td>⑩</td><td>Branching</td><td>Flow selector unit</td><td>10) Selection of flow selector unit
<table>
<tr><th>Model name</th><th>Total capacity rank of connectable indoor unit</th><th>Max. No. of connected indoor units</th></tr>
<tr><td>RBM-Y1122FE</td><td>below 11.2 kW</td><td>5</td></tr>
<tr><td>RBM-Y1802FE</td><td>11.2 to below 18.0kW</td><td>8</td></tr>
<tr><td>RBM-Y2802FE</td><td>18.0 below 28.0kW or less</td><td>8</td></tr>
</table>
∗ Confirm also Installation Manual of flow selector unit.</td></tr>
</table>



5-4. Allowable Length/Height Difference of Refrigerant Piping



* Allowable length and height difference of refrigerant piping

			Allowable value	Piping section
Pipe Length	Total extension of pipe (Liquid pipe, real length)		300 m	LA+La+Lb+Lc+L1+L2+L3+L4+L5+L6+L7+L8+9 +a+b+c+d+e+f+g+h+i+j+k+l+m+n+o+p+q
	Farthest piping length L (*1)	Real length	125 m	LA+Lc+L1+L3+L4+L5+L6+L7+L8+q
		Equivalent length	150 m	
	Max. equivalent length of main piping		85 m	L1
	Equivalent length of farthest piping from 1st branching Li (*1)		50 m	L3+L4+L5+L6+L7+L8+q
	Max. real length of indoor unit connecting piping		30 m	a+g, b+h, c+i, d+l, e+m, f+n, j, k
	Max. real length between FS unit and indoor unit (*2)		15 m	g, h, i, l, m, n, L7+o, L7+L8+p, L7+L8+q
	Max. Equivalent length of outdoor unit connecting piping LO (*1)		25 m	LA+Lc (LA+Lb)
	Max. real length of outdoor unit connecting piping		10 m	La, Lb, Lc
	Max. equivalent length between FS unit and indoor unit Lj		30 m	L7+L8+q, L7+L8+p
	Max. real length between FS unit and header indoor unit Lh (*2)		15 m	L7+o
Height Difference	Height between indoor and outdoor units H1	Upper outdoor unit	50 m	——
		Lower outdoor unit	30 m	——
	Height between indoor units H2	Upper outdoor unit	35 m	——
		Lower outdoor unit	15 m	——
	Height between outdoor units H3		5 m	——
	Height difference between indoor units in group control by one FS unit H4		0.5 m	——

*1 : The farthest outdoor unit from 1st branch to be named C, and farthest indoor unit from 1st branch to be named (q).

*2 : Attached connection cable can be used up to 5 m in pipe length between indoor and FS unit. When the pipe length between indoor and FS unit exceeds 5 m, be sure to use the connection cable kit (RBC-CBK15FE).

* System restrictions

Max. No. of combined outdoor units	3 units	
Max. capacity of combined outdoor units	84.0 kW	
Max. No. of connected indoor units	48 units	
Max. capacity of combined indoor units	H2 ≤ 15m	135% (*1)
	H2 > 15m	105%

*1 : MMY-MAP1201HT8 : UP to 120 %

Note 1) Combination of outdoor units : Header unit (1 unit) + Follower unit (0 to 2 units). Header unit is outdoor unit nearest to the connected indoor units

Note 2) Install the outdoor units in order of capacity. (Header unit ≥ Follower unit 1 ≥ Follower unit 2)

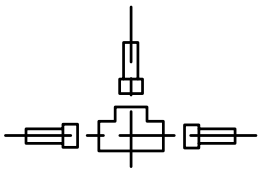
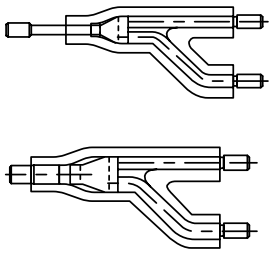
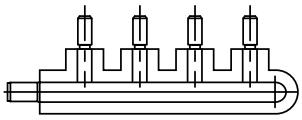
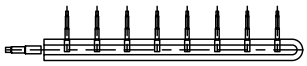
Note 3) Refer to outdoor unit combination table in page.6.

Note 4) Piping to indoor units shall be perpendicular to piping to the head outdoor unit as <Ex.1>. Do not connect piping to indoor units in the same direction of head outdoor unit as <Ex.2>.

• Brazed couplings and special branches

- Use suitable parts for typical elbow couplings and socket couplings. (Consider the size, material, thickness, etc.)
- Special branches

Use deoxidized parts sold separately.

Branching at outdoor unit side	Branching at indoor unit side		
T-shape branching joint	Branching joint	Branch header	
		4 branching	8 branching
RBM-BT13FE	RBM-BY53E RBM-BY103E RBM-BY203E RBM-BY303E RBM-BY53FE RBM-BY103FE RBM-BY203FE RBM-BY303FE	RBM-HY1043E RBM-HY2043E RBM-HY1043FE RBM-HY2043FE	RBM-HY1083E RBM-HY2083E RBM-HY1083FE RBM-HY2083FE
			

• Solder

Because only “copper-to-copper” connections are made in the multi type air conditioning system, use the hard solder “phosphor copper solder.”

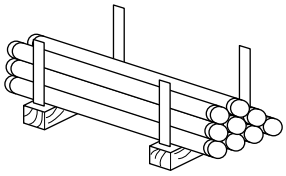
5-5. Careful Handling

Careful handling is the most important step in preventing moisture, dirt, and dust from getting inside of the pipes. Moisture in pipes has caused major problems in numerous instances in the past. Therefore, it is important to be as careful as possible in order to prevent problems before they occur.

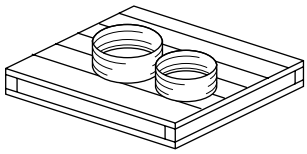
Pipe delivery and storage

When pipes are delivered, care should be taken to prevent it from becoming bent or deformed, and the ends of the pipes should be capped in order to prevent dirt, mud, rain, etc., from getting inside. Build a wooden frame to hold the pipes securely, and store the pipes in the specified location.

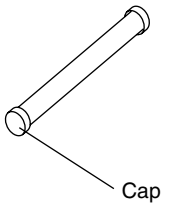
Delivery of copper pipes without caps to a work site is not acceptable.



Frame for careful handling and to prevent rolling



Careful handling on a pallet



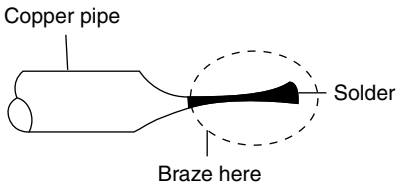
Pipe caps

The ends of all pipes must be sealed. The most reliable method is the “pinch method,” but the taping method can be selected in some circumstances.

Location	Time for installation	Careful handling method
Outdoors	One month or more	Pinch method
	Less than one month	Pinch or taping method
Indoors	Does not matter	Pinch or taping method

■ Pinch method

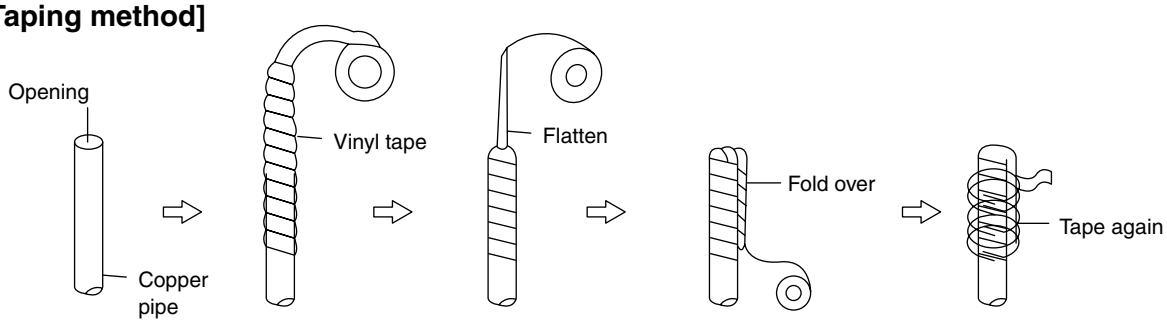
Pinch the end of the copper pipe closed, and braze any opening closed.



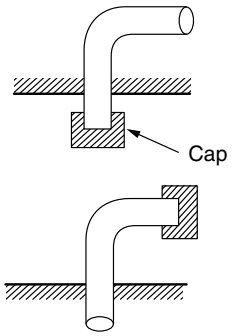
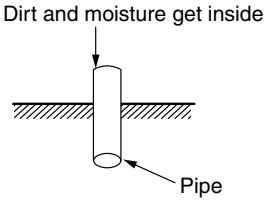
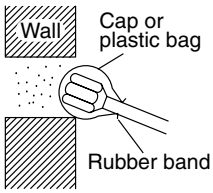
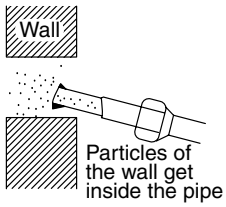
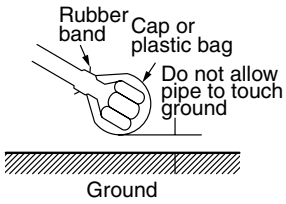
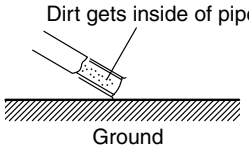
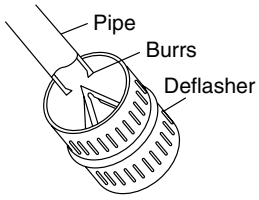
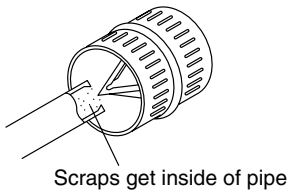
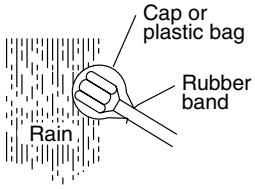
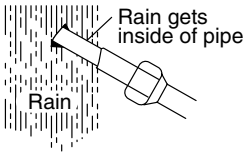
■ Taping method

Cover the end of the copper pipe with vinyl tape.

[Taping method]



CAUTIONS

	GOOD	NOT GOOD
1) Do not allow dirt or moisture inside of the pipes. • Keep the open ends of all pipes capped until all pipes have been connected. • Pipe openings should face horizontally or downwards if at all possible.		
2) When passing a pipe through an opening in a wall, always keep the end of the pipe capped.		
3) Do not place pipes directly on the ground. Do not scrape pipes on the ground.		
4) When deflashing (removing burrs from) a pipe, point the opening downwards so that no scraps fall inside of the pipe.		
5) When installing pipes on a rainy day, always keep the ends of the pipes capped.		

5-6. Parts of Branching Header/Joint

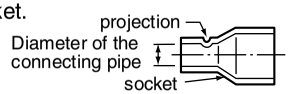
Branching Header : RBM-HY1043E / HY1083E / HY2043E / HY2083E

Branching Joint : RBM-BY53E / BY103E / BY203E / BY303E

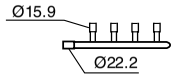
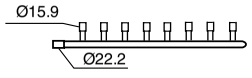
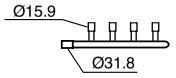
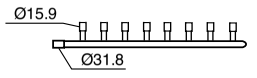
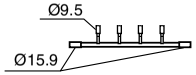
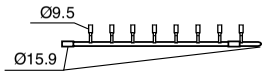
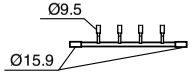
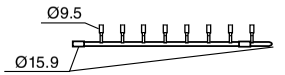
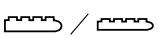
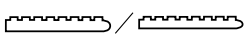
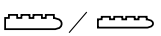
- Check the following parts in the package.
- For piping material and size of the refrigerant pipes, refer to the Installation Manual of the Air Conditioner.

NOTE : 1. All dimensions are in millimeters. In the following tables, ( ) indicates diameter of the indicated position, and others indicate diameter of the connecting pipe.

2. Please connect pipe to the side with a projection of the socket. (51, 52, 54, 58, 59, 61, 62, 70, 89: without projection)

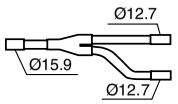
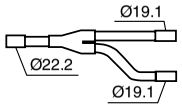
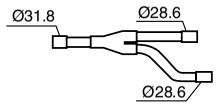
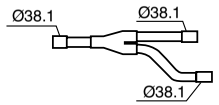
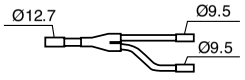
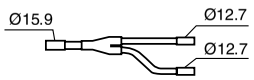
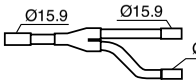
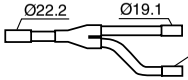
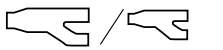


Branching Header

NAME \ MODEL	RBM-HY1043E	RBM-HY1083E	RBM-HY2043E	RBM-HY2083E
Branching header gas side	 1pc	 1pc	 1pc	 1pc
Branching header liquid side	 1pc	 1pc	 1pc	 1pc
Heat insulator (gas side/liquid side)	 1pc each	 1pc each	 1pc each	1pc each
Socket Gas side (diameter of the connected pipe)	No. ⑭ Ø15.9 x (Ø22.2) 1pc; ⑱ Ø19.1 x (Ø22.2) 1pc; ⑳ Ø28.6 x (Ø22.2) 1pc	No. ⑥ Ø 9.5 x (Ø15.9) 4pcs; ⑨ Ø12.7 x (Ø15.9) 4pcs	No. ⑭ Ø15.9 x (Ø22.2) 1pc; ⑱ Ø19.1 x (Ø22.2) 1pc; ⑳ Ø28.6 x (Ø22.2) 1pc	No. ⑥ Ø 9.5 x (Ø15.9) 8pcs; ⑨ Ø12.7 x (Ø15.9) 8pcs
Socket Liquid side (external diameter of socket)	No. ⑥ Ø 9.5 x (Ø15.9) 1pc; ⑨ Ø12.7 x (Ø15.9) 1pc	No. ⑪ Ø 6.4 x (Ø 9.5) 4pcs	No. ⑥ Ø 9.5 x (Ø15.9) 1ps; ⑨ Ø12.7 x (Ø15.9) 1ps	No. ⑪ Ø 6.4 x (Ø 9.5) 8pcs
Outlet sealed pipe at gas side Header sealed pipe at liquid side	(Ø15.9) 1pc (Ø15.9) 1pc	(Ø15.9) 3pcs (Ø15.9) 1pc	(Ø15.9) 1pc (Ø15.9) 1pc	(Ø15.9) 3pcs (Ø15.9) 1pc
Outlet sealed pipe at liquid side	(Ø 9.5) 1pc	(Ø 9.5) 3pcs	(Ø 9.5) 1pc	(Ø 9.5) 3pcs

NAME \ MODEL	RBM-HY2043E	RBM-HY2083E
Socket Gas side	No. ㉗ Ø28.6 x (Ø31.8) 1pc; ㉙ Ø34.9 x (Ø31.8) 1pc	No. ㉗ Ø28.6 x (Ø31.8) 1pc; ㉙ Ø34.9 x (Ø31.8) 1pc
	No. ⑥ Ø 9.5 x (Ø15.9) 2pcs; ⑨ Ø12.7 x (Ø15.9) 2pcs	No. ⑥ Ø 9.5 x (Ø15.9) 7pcs; ⑨ Ø12.7 x (Ø15.9) 7pcs
Socket Liquid side	No. ⑪ Ø 6.4 x (Ø 9.5) 4pcs	No. ⑪ Ø 6.4 x (Ø 9.5) 7pcs
Outlet sealed pipe at gas side Header sealed pipe at liquid side	(Ø15.9) 1pc (Ø15.9) 1pc	(Ø15.9) 3pcs (Ø15.9) 1pc
Outlet sealed pipe at liquid side	(Ø 9.5) 1pc	(Ø 9.5) 3pcs

Branching Joint

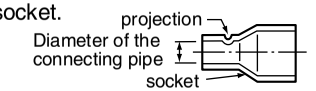
NAME \ MODEL	RBM-BY53E	RBM-BY103E	RBM-BY203E	RBM-BY303E
Branching joint gas side	 1pc	 1pc	 1pc	 1pc
Branching joint liquid side	 1pc	 1pc	 1pc	 1pc
Heat insulator (gas side/liquid side)	1pc each	 1pc each	1pc each	1pc each
Socket Gas side (diameter of the connected pipe)	No. ⑨ Ø12.7 x (Ø15.9) 1pc; 51 Ø19.1 x (Ø15.9) 1pc	No. ⑤ Ø 9.5 x (Ø12.7) 2pcs; 54 Ø15.9 x (Ø12.7) 2pcs	No. ⑱ Ø19.1 x (Ø22.2) 1pc; ⑳ Ø28.6 x (Ø22.2) 1pc	No. ⑦ Ø 9.5 x (Ø19.1) 1pc; ⑩ Ø12.7 x (Ø19.1) 1pc; 13 Ø15.9 x (Ø19.1) 2pcs; 52 Ø22.2 x (Ø19.1) 2pcs; 89 Ø28.6 x (Ø19.1) 1pc
Socket Liquid side (external diameter of socket)	No. ⑤ Ø 9.5 x (Ø12.7) 1pc	No. ⑪ Ø 6.4 x (Ø 9.5) 2pcs	No. ⑥ Ø 9.5 x (Ø15.9) 1pc; ⑨ Ø12.7 x (Ø15.9) 1pc	No. ② Ø 6.4 x (Ø12.7) 1pc; ⑤ Ø 9.5 x (Ø12.7) 2pcs; 54 Ø15.9 x (Ø12.7) 1pc

NAME \ MODEL	RBM-BY203E	RBM-BY303E
Socket Gas side	No. ㉗ Ø28.6 x (Ø31.8) 1pc; ㉙ Ø34.9 x (Ø31.8) 1pc	
	No. ㊽ Ø 9.5 x (Ø28.6) 1pc; ㊾ Ø12.7 x (Ø28.6) 1pc; ⑯ Ø15.9 x (Ø28.6) 1pc; ⑳ Ø19.1 x (Ø28.6) 1pc; ㊸ Ø22.2 x (Ø28.6) 2pcs; ㊽ Ø34.9 x (Ø28.6) 1pc	No. ㊼ Ø 9.5 x (Ø38.1) 1pc; ㊻ Ø12.7 x (Ø38.1) 1pc; ㊺ Ø15.9 x (Ø38.1) 1pc; ㊹ Ø19.1 x (Ø38.1) 1pc; ㊸ Ø22.2 x (Ø38.1) 1pc; ㊶ Ø28.6 x (Ø38.1) 2pcs; ㊶ Ø34.9 x (Ø38.1) 1pc; ㊷ Ø41.3 x (Ø38.1) 1pc
Socket Liquid side	No. ⑭ Ø15.9 x (Ø22.2) 1pc; ⑱ Ø19.1 x (Ø22.2) 1pc	No. ㊹ Ø 6.4 x (Ø19.1) 1pc; ㊼ Ø 9.5 x (Ø19.1) 1pc; ⑩ Ø12.7 x (Ø19.1) 1ps; 13 Ø15.9 x (Ø19.1) 2pcs; 52 Ø22.2 x (Ø19.1) 1pc

Branching Header : RBM-HY1043FE / HY1083FE / HY2043FE / HY2083FE
Branching Joint : RBM-BY53FE / BY103FE / BY203FE / BY303FE

- Check the following parts in the package.
- For piping material and size of the refrigerant pipes, refer to the Installation Manual of the Air Conditioner.

NOTE : 1. All dimensions are in millimeters. In the following tables, ( ) indicates diameter of the indicated position, and others indicate diameter of the connecting pipe.
2. Please connect pipe to the side with a projection of the socket. (⑤①, ⑤②, ⑤④, ⑤⑧, ⑤⑨, ⑦⓪, ⑧⑨: without projection)



Branching Header

NAME \ MODEL	RBM-HY1043FE	RBM-HY1083FE	RBM-HY2043FE	RBM-HY2083FE
Suction gas side	Ø22.2 / Ø15.9 1pc	Ø22.2 / Ø15.9 1pc	Ø31.8 / Ø15.9 1pc	Ø31.8 / Ø15.9 1pc
Discharge gas side	Ø22.2 / Ø15.9 1pc	Ø22.2 / Ø15.9 1pc	Ø22.2 / Ø15.9 1pc	Ø22.2 / Ø15.9 1pc
Liquid side	Ø15.9 / Ø9.5 / Ø15.9 1pc	Ø15.9 / Ø9.5 / Ø15.9 1pc	Ø15.9 / Ø9.5 / Ø15.9 1pc	Ø15.9 / Ø9.5 / Ø15.9 1pc
Heat insulator (suction gas side/ discharge gas side/liquid side)	1pc each	1pc each	1pc each	1pc each
Socket (diameter of the connected pipe / external diameter of socket)	No. ⑭ Ø15.9 x (Ø22.2) 1pc ⑦⓪ Ø28.6 x (Ø22.2) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 3pcs ⑨ Ø12.7 x (Ø15.9) 4pcs	No. ⑭ Ø15.9 x (Ø22.2) 1pc ⑦⓪ Ø28.6 x (Ø22.2) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 7pcs ⑨ Ø12.7 x (Ø15.9) 8pcs	No. ②⑦ Ø28.6 x (Ø31.8) 1pc ⑤⑨ Ø34.9 x (Ø31.8) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 2pcs ⑨ Ø12.7 x (Ø15.9) 2pcs	No. ②⑦ Ø28.6 x (Ø31.8) 1pc ⑤⑨ Ø34.9 x (Ø31.8) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 7pcs ⑨ Ø12.7 x (Ø15.9) 7pcs
Suction gas side	⑧⑤ Ø12.7 x (Ø22.2) 1pc ①⑧ Ø19.1 x (Ø22.2) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 4pcs ⑨ Ø12.7 x (Ø15.9) 4pcs	⑧⑤ Ø12.7 x (Ø22.2) 1pc ①⑧ Ø19.1 x (Ø22.2) 1pc No. ⑥ Ø 9.5 x (Ø15.9) 8pcs ⑨ Ø12.7 x (Ø15.9) 8pcs	⑦⓪ Ø28.6 x (Ø22.2) 1pc No. ⑨ Ø12.7 x (Ø15.9) 4pcs	⑦⓪ Ø34.9 x (Ø22.2) 1pc No. ⑨ Ø12.7 x (Ø15.9) 8pcs
Discharge gas side	No. ⑥ Ø 9.5 x (Ø15.9) 4pcs ⑨ Ø12.7 x (Ø15.9) 4pcs	No. ⑥ Ø 9.5 x (Ø15.9) 8pcs ⑨ Ø12.7 x (Ø15.9) 8pcs		
Liquid side	⑥ Ø 9.5 x (Ø15.9) 1pc ⑨ Ø12.7 x (Ø15.9) 1pc No. ⑪ Ø 6.4 x (Ø 9.5) 4pcs	⑥ Ø 9.5 x (Ø15.9) 1pc ⑨ Ø12.7 x (Ø15.9) 1pc No. ⑪ Ø 6.4 x (Ø 9.5) 8pcs	⑤① Ø19.1 x (Ø15.9) 1pc No. ⑪ Ø 6.4 x (Ø 9.5) 4pcs	⑤① Ø19.1 x (Ø15.9) 1pc No. ⑪ Ø 6.4 x (Ø 9.5) 7pcs
Outlet sealed pipe at suction gas side Outlet sealed pipe at discharge gas side	(Ø15.9) 1pc (Ø15.9) 3pcs	(Ø15.9) 3pcs (Ø15.9) 7pcs	(Ø15.9) 1pc (Ø15.9) 3pcs	(Ø15.9) 3pcs (Ø15.9) 7pcs
Outlet sealed pipe at liquid side	(Ø 9.5) 1pc	(Ø 9.5) 3pcs	(Ø 9.5) 1pc	(Ø 9.5) 3pcs
Header sealed pipe at liquid side	(Ø15.9) 1pc	(Ø15.9) 1pc	(Ø15.9) 1pc	(Ø15.9) 1pc

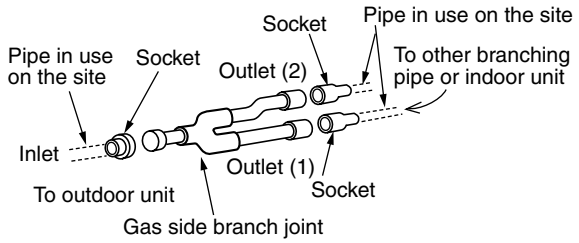
Branching Joint

NAME \ MODEL	RBM-BY53FE	RBM-BY103FE	RBM-BY203FE	RBM-BY303FE
Suction gas side	Ø15.9 / Ø12.7 / Ø12.7 1pc	Ø22.2 / Ø19.1 / Ø19.1 1pc	Ø31.8 / Ø28.6 / Ø28.6 1pc	Ø38.1 / Ø38.1 / Ø38.1 1pc
Discharge gas side	Ø15.9 / Ø12.7 / Ø12.7 1pc	Ø22.2 / Ø19.1 / Ø19.1 1pc	Ø22.2 / Ø19.1 / Ø19.1 1pc	Ø31.8 / Ø28.6 / Ø28.6 1pc
Liquid side	Ø12.7 / Ø9.5 / Ø9.5 1pc	Ø15.9 / Ø12.7 / Ø12.7 1pc	Ø15.9 / Ø12.7 / Ø12.7 1pc	Ø22.2 / Ø19.1 / Ø19.1 1pc
Heat insulator (suction gas side/discharge gas side/liquid side)	1pc each	1pc each	1pc each	1pc each
Socket (diameter of the connected pipe / external diameter of socket)	No. ⑤ Ø 9.5 x (Ø12.7) 2pcs ⑤④ Ø15.9 x (Ø12.7) 2pcs	No. ⑦⓪ Ø28.6 x (Ø22.2) 1pc ⑦ Ø 9.5 x (Ø19.1) 1pc ① Ø12.7 x (Ø19.1) 1pc ⑬ Ø15.9 x (Ø19.1) 2pcs ⑤② Ø22.2 x (Ø19.1) 2pcs ⑧⑨ Ø28.6 x (Ø19.1) 1pc	No. ②⑦ Ø28.6 x (Ø31.8) 1pc ④⑧ Ø 9.5 x (Ø28.6) 1pc ④⑨ Ø12.7 x (Ø28.6) 1pc ① Ø15.9 x (Ø28.6) 1pc ④③ Ø22.2 x (Ø28.6) 2pcs ⑤⑧ Ø34.9 x (Ø28.6) 1pc	No. ⑥① Ø34.9 x (Ø38.1) 1pc ⑦⑦ Ø 9.5 x (Ø38.1) 1pc ⑦⑥ Ø12.7 x (Ø38.1) 1pc ⑦⑤ Ø15.9 x (Ø38.1) 1pc ⑦③ Ø22.2 x (Ø38.1) 1pc ⑦① Ø28.6 x (Ø38.1) 2pcs ⑤① Ø34.9 x (Ø38.1) 2pcs
Discharge gas side	⑨ Ø12.7 x (Ø15.9) 1pc No. ⑤ Ø 9.5 x (Ø12.7) 2pcs ⑤④ Ø15.9 x (Ø12.7) 1pc Sealed pipe x (Ø12.7) 1pc	①⑧ Ø19.1 x (Ø22.2) 1pc ⑩ Ø12.7 x (Ø19.1) 2pcs ⑤② Ø22.2 x (Ø19.1) 1pc Sealed pipe x (Ø19.1) 1pc	⑦⓪ Ø28.6 x (Ø22.2) 1pc ⑩ Ø12.7 x (Ø19.1) 1pc ⑤② Ø22.2 x (Ø19.1) 2pcs ⑧⑨ Ø28.6 x (Ø19.1) 1pc Sealed pipe x (Ø19.1) 1pc	②⑦ Ø28.6 x (Ø31.8) 1pc ④⑨ Ø12.7 x (Ø28.6) 1pc ②⓪ Ø19.1 x (Ø28.6) 1pc ④③ Ø22.2 x (Ø28.6) 2pcs Sealed pipe x (Ø28.6) 1pc
Liquid side	⑤ Ø 9.5 x (Ø12.7) 1pc No. ⑪ Ø 6.4 x (Ø 9.5) 2pcs	⑨ Ø12.7 x (Ø15.9) 1pc ⑫ Ø 6.4 x (Ø12.7) 1pc ⑤ Ø 9.5 x (Ø12.7) 2pcs ⑤④ Ø15.9 x (Ø12.7) 1pc	⑤① Ø19.1 x (Ø15.9) 1pc ⑫ Ø 6.4 x (Ø12.7) 1pc ⑤ Ø 9.5 x (Ø12.7) 1pc ⑤④ Ø15.9 x (Ø12.7) 2pcs	①⑧ Ø19.1 x (Ø22.2) 1pc ⑭ Ø 6.4 x (Ø19.1) 1pc ⑦⑦ Ø 9.5 x (Ø19.1) 1pc ⑩ Ø12.7 x (Ø19.1) 1pc ⑬ Ø15.9 x (Ø19.1) 1pc

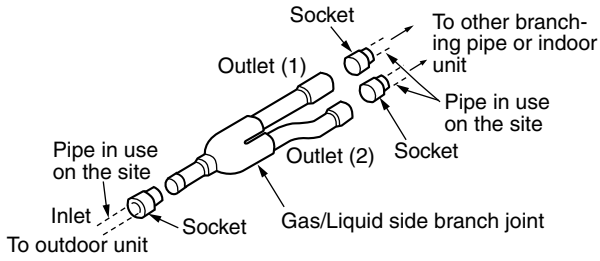
5-7. Branching Kit Connection Method

[1] Branch joint

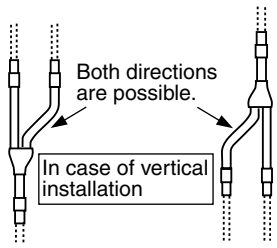
<Suction gas/Discharge gas side>



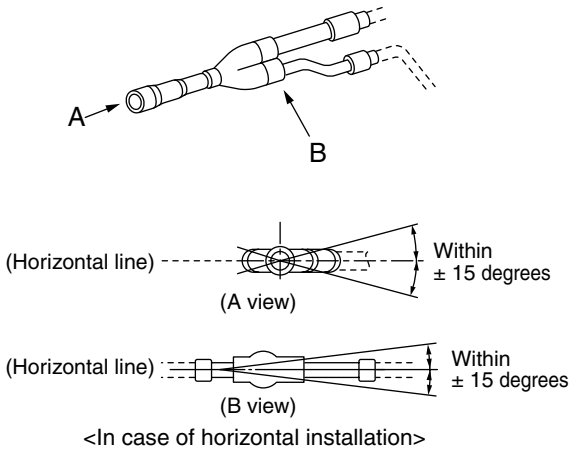
<Liquid side>



- Installation direction of branch pipe
  Install the branching pipes so that it branch either vertically or horizontally.



<Suction gas/Discharge gas/Liquid side>



<In case of horizontal installation>

NOTE :

- Install the branch pipes horizontally or vertically so that they are branched evenly.
- Install the branching joint within ±15 degrees.

NOTE :

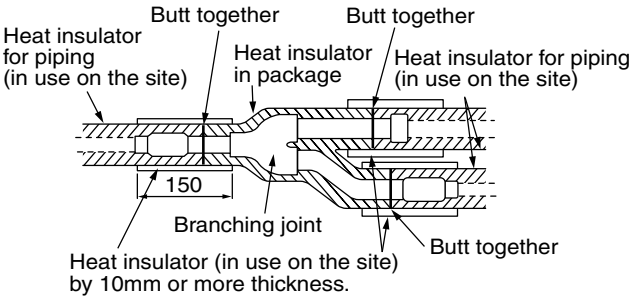
Install the branch pipes horizontally or vertically so that they branch evenly.

Install the branching joint within ± 15 degrees.

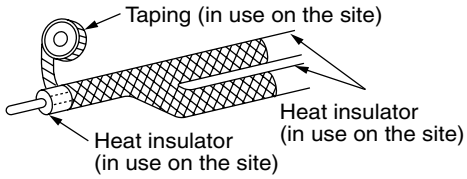
Heat insulating for pipes (Branching Joint)

- In order to prevent dripping at the place where the insulation provided with the branching kit meets the insulating material obtained on the site, butt the two types of insulation up against each other, and then wrap the seam between the two types of insulation in at least 10mm of the insulating material (in use on the site).

<Suction gas/Discharge gas/Liquid side>


Butt together
Butt together
Heat insulator for piping (in use on the site)
Heat insulator in package
Heat insulator for piping (in use on the site)
150
Branching joint
Butt together
Heat insulator (in use on the site) by 10mm or more thickness.

- On the gas-side pipe, use insulation that can withstand heat of 120°C or higher. For the branch pipe, either use a commercially available coupling cover (for T-shape) that is at least 10mm thick, or else insulate the pipe as shown in the figure at below.
- After applying insulation as outlined above, tape the insulation in place.

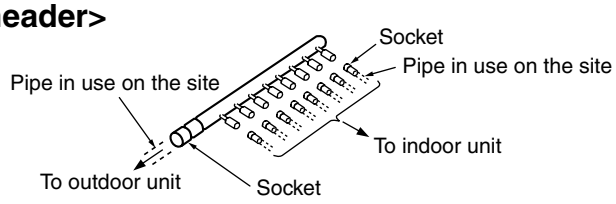


[2] Branch header

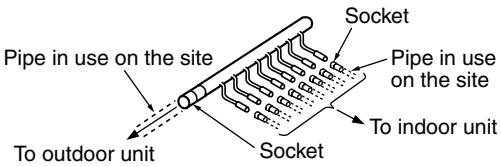
Branching Header

Select and install the socket that matches the diameter of a pipe to be connected to the indoor unit.

<Suction gas/Discharge gas side branch header>

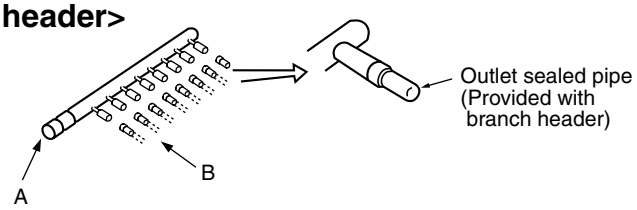


<Liquid-side branch header>

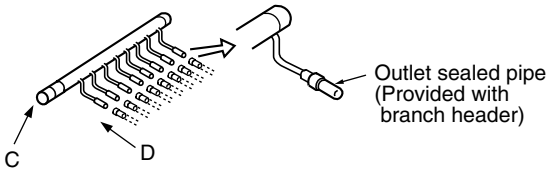


- If the number of indoor units to be connected is fewer than the maximum number of units that can be connected to the branch header, attach a sealed pipe to the unused connectors.

<Suction gas/Discharge gas side branch header>

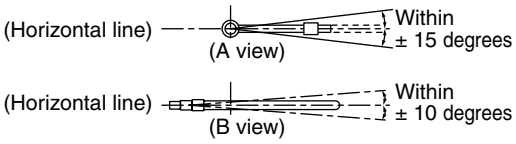


<Liquid-side branch header>

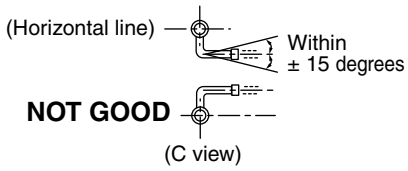


- Install the branch header so that it branches horizontally. It cannot be used in a vertical position.

<Suction gas/Discharge gas side>



<Liquid-side>



When arranging the branching header at the liquid side, attach a header sealed pipe on the sealing side of the header as shown in the fiqure at below.

Be sure to install the branch pipe downward.

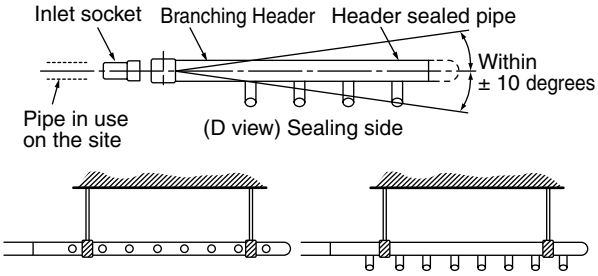
Horizontal viewed from D point should be within ± 10 degrees same as view B.

- Supporting branching header

  After applying the insulation, set the hanging metals as support. (in use on the site).

NOTE :

1. Install the branching header so that it branches horizontally. It cannot be used in a vertical position.
2. Do not use T-type pipe for the branching section.



CAUTION

1. On the inlet side of a Y-type branch joint or branch header, allow for at least 300mm of straight pipe.
2. A Y-type branch joint can be installed so that it branches either vertically or horizontally; if branching horizontally, it should be within an angle of ± 15°.
3. A branch header should be installed so that it branches horizontally.
4. Do not use T-type branch joints.

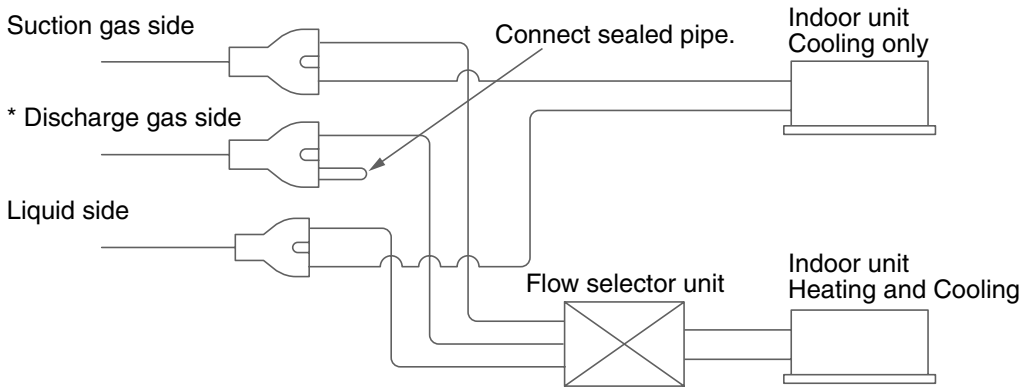
CAUTION

In the multi air conditioning system, because the refrigerant pipes congregate at the rooftop pipeshaft outlet in the vertical pipeshaft, it is necessary to attach “labels” to each pipe in order to make clear to which system a given pipe belongs so as to prevent pipes from being connected incorrectly.

How to connect “Cooling Only” indoor unit

Branch joint

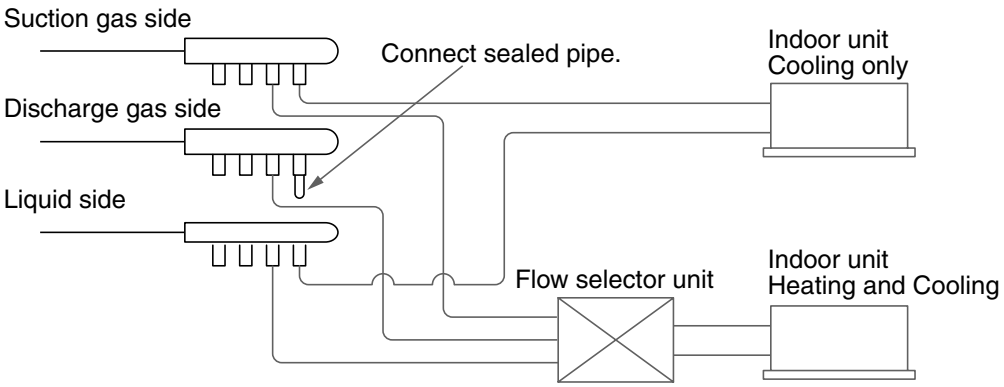
- When connecting a Cooling Only indoor unit, attach a sealed pipe to the unused connectors of the branching pipe of discharge gas side.



* Refer to above. There is the method of connecting without using branching joint pipe of discharge gas side. For details, refer to the Installation Manual of the Air Conditioner.

Branch header

- When connecting a Cooling Only indoor unit, attach a sealed pipe to the unused connectors of the branching pipe of discharge gas side.



[NOTE]

For cooling only indoor unit in Super-HRM system, item code (DN) setting from the wired remote controller is necessary. (Refer to the section “**13-1.**”)

[3] T-shape branching joint (For connection of outdoor unit)

RBM-BT13FE

Please read "Safety Cautions" described in the Installation Manual of the Air Conditioner.

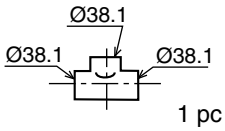
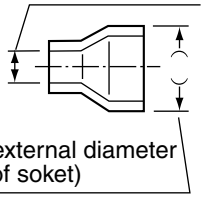
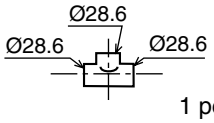
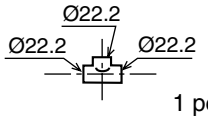
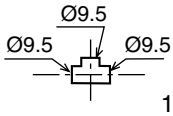
- Check the following parts in the package.
- For piping material and size of the refrigerant pipes, refer to the Installation Manual of the Air Conditioner.

Parts

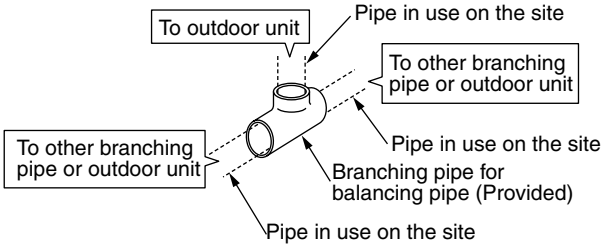
NOTE :

All dimentions are in millimeters.

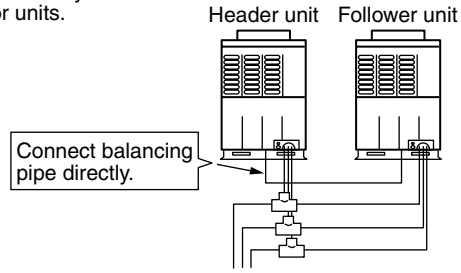
In the following tables, ( ) indicates diameter of the indicated position, and others indicate diameter of the connected pipe.

	RBM-BT13E (T-shape branching joint)			
	Branching joint	**Socket**	**No.**	**Diameter**
Suction Gas side	 1 pc		(61) (71) (73)	Ø34.9 x (Ø38.1) 1pc Ø28.6 x (Ø38.1) 3pcs Ø22.2 x (Ø38.1) 2pcs
Discharge gas side	 1 pc		(20) (43)	Ø19.1 x (Ø28.6) 2pcs Ø22.2 x (Ø28.6) 2pcs
Liquid side	 1 pc		(14) (18) (85)	Ø15.9 x (Ø22.2) 1pc Ø19.1 x (Ø22.2) 1pc Ø12.7 x (Ø22.2) 2pcs
For balancing pipe	 1 pc	———		———

<Branching pipe for balancing pipe>

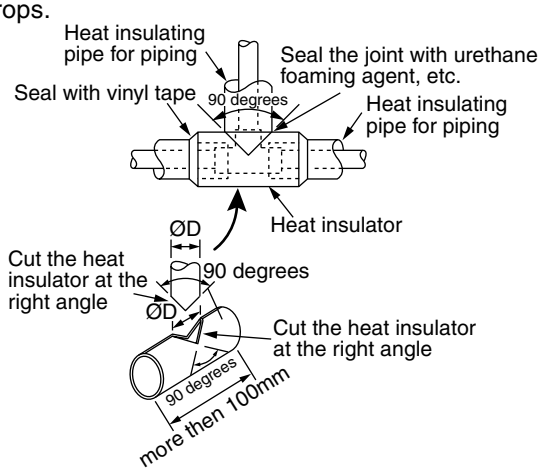

To outdoor unit
Pipe in use on the site
To other branching pipe or outdoor unit
To other branching pipe or outdoor unit
Pipe in use on the site
Branching pipe for balancing pipe (Provided)
Pipe in use on the site

• When combining two units, connect directly between outdoor units.

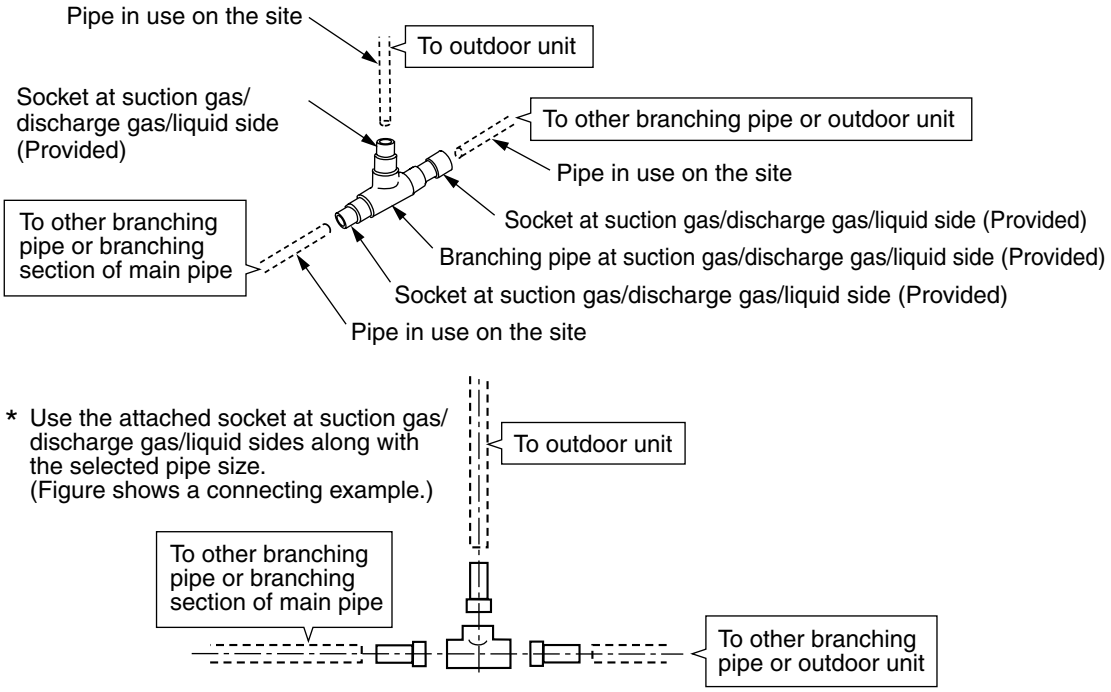


<Heat insulating for pipe (In use of the site)>

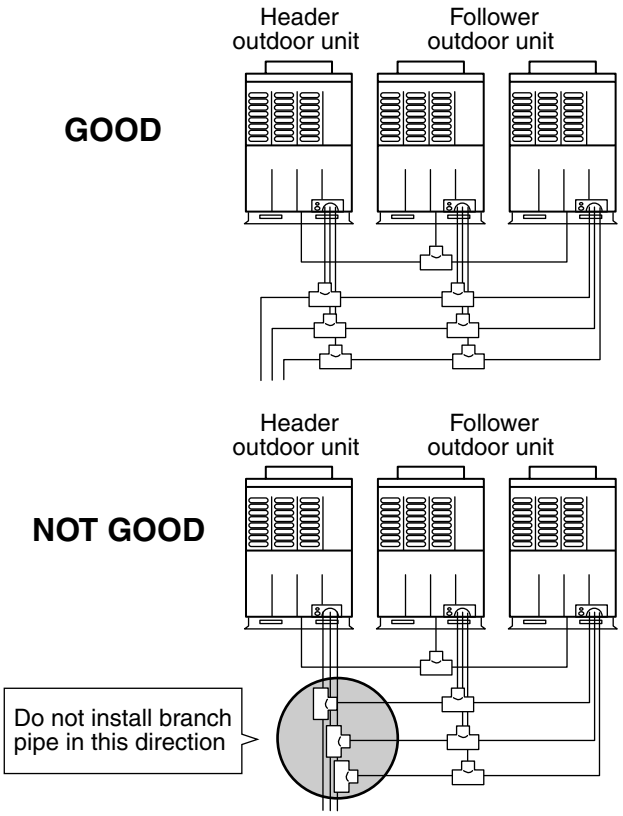
- Be sure to perform heat insulating at liquid side and gas side, and balancing pipes separately. (Heat insulator for balancing is not provided.)
- Use heat-resisting heat insulator (120°C or more) for pipes at gas side.
- To insulate heat of the branching pipes, use a joint cover (For T-shape) available on the market that is with 10mm or more thickness, or one applied with machining as shown in the figure.
- Seal the branching piping completely without clearance to prevent dewing or falling of water drops.



<Branching pipes at suction gas side/discharge gas side/liquid side>


Pipe in use on the site
To outdoor unit
Socket at suction gas/ discharge gas/liquid side (Provided)
To other branching pipe or outdoor unit
Pipe in use on the site
To other branching pipe or branching section of main pipe
Socket at suction gas/discharge gas/liquid side (Provided)
Branching pipe at suction gas/discharge gas/liquid side (Provided)
Socket at suction gas/discharge gas/liquid side (Provided)
Pipe in use on the site
* Use the attached socket at suction gas/ discharge gas/liquid sides along with the selected pipe size. (Figure shows a connecting example.)
To outdoor unit
To other branching pipe or branching section of main pipe
To other branching pipe or outdoor unit

• Installation of branching pipes to suction gas/discharge gas/liquid sides.



5-8. External Dimensions of Branch Connectors

(Outline drawings are shown on the following pages.)

Branching joints and headers

<table>
<tr><th></th><th>Model name</th><th colspan="2">Usage</th><th>Appearance</th></tr>
<tr><td rowspan="9">Y-shape branching joint (*3)</td><td>RBM-BY53FE</td><td>Indoor unit capacity code (*1) : Total below 6.4</td><td rowspan="4">For 3 piping</td><td rowspan="9"> </td></tr>
<tr><td>RBM-BY103FE</td><td>Indoor unit capacity code (*1) : Total 6.4 or more and below 14.2</td></tr>
<tr><td>RBM-BY203FE</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td></tr>
<tr><td>RBM-BY303FE</td><td>Indoor unit capacity code (*1) : Total 25.2 or more</td></tr>
<tr><td>RBM-BY53E</td><td>Indoor unit capacity code (*1) : Total below 6.4</td><td rowspan="4">For 2 piping (*6)</td></tr>
<tr><td>RBM-BY103E</td><td>Indoor unit capacity code (*1) : Total 6.4 or more and below 14.2</td></tr>
<tr><td>RBM-BY203E</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td></tr>
<tr><td>RBM-BY303E</td><td>Indoor unit capacity code (*1) : Total 25.2 or more</td></tr>
<tr><td rowspan="4">4-branching header (*4) (*5)</td><td>RBM-HY1043FE</td><td>Indoor unit capacity code (*1) : Total below 14.2</td><td>For 3 piping</td><td rowspan="8"> </td></tr>
<tr><td>RBM-HY2043FE</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td><td rowspan="2">For 2 piping (*6)</td></tr>
<tr><td>RBM-HY1043E</td><td>Indoor unit capacity code (*1) : Total below 14.2</td></tr>
<tr><td>RBM-HY2043E</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td></tr>
<tr><td rowspan="4">8-branching header (*4) (*5)</td><td>RBM-HY1083FE</td><td>Indoor unit capacity code (*1) : Total below 14.2</td><td>For 3 piping</td></tr>
<tr><td>RBM-HY2083FE</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td><td rowspan="2">For 2 piping (*6)</td></tr>
<tr><td>RBM-HY1083E</td><td>Indoor unit capacity code (*1) : Total below 14.2</td></tr>
<tr><td>RBM-HY2083E</td><td>Indoor unit capacity code (*1) : Total 14.2 or more and below 25.2</td></tr>
<tr><td>T-shape branching joint (For connection of outdoor units)</td><td>RBM-BT13FE</td><td colspan="3">1 set 4 types T-shape joint pipes as described below:
The required quantity is arranged and they are combined on site.
<table>
<tr><th>Connection piping</th><th>Corresponded dia. (mm)</th><th>Q'ty</th></tr>
<tr><td>Balance pipe</td><td>Ø 9.5</td><td>1</td></tr>
<tr><td>Piping at liquid side</td><td>Ø12.7 to Ø22.2</td><td>1</td></tr>
<tr><td>Piping at discharge gas side</td><td>Ø19.1 to Ø28.6</td><td>1</td></tr>
<tr><td>Piping at suction gas side</td><td>Ø22.2 to Ø38.1</td><td>1</td></tr>
</table></td></tr>
</table>

*1 "Capacity code" can be obtained from page 6. (Capacity code is not actual capacity.)
*2 If total capacity code value of indoor unit exceeds that of outdoor unit, apply capacity code of outdoor unit.
*3 When using Y-shape branching joint for 1st branching, select according to capacity code of outdoor unit.
*4 Max. 6.0 capacity code in total can be connected.
*5 If the capacity code of outdoor unit is 26 or more, it is not used for 1st branching.
*6 This is used for branching to "cooling only" indoor unit.
*7 Model names for outdoor and indoor units described in this guide are shortened because of the space constraint.

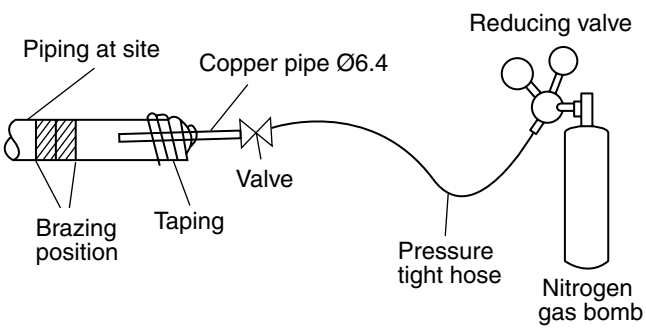
5-9. Nitrogen Gas Blow Method (During Brazing)

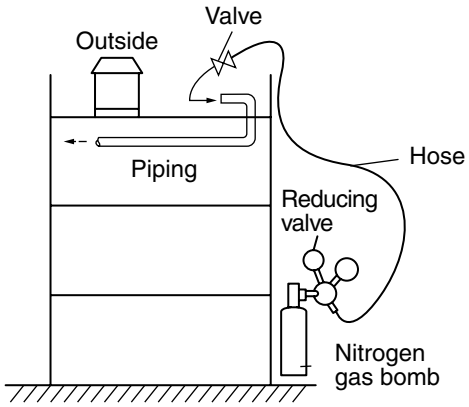
- If nitrogen gas is not passed through the pipes during brazing, a film of oxidized material will form on the inner surfaces of the pipes. The presence of a such a film in the system will adversely affect the operation of the valves and compressor in the refrigerant system, and will prevent the system from operating normally.
- In order to prevent this from occurring, nitrogen gas is passed through the pipes while brazing is in progress. This process of replacing the air in the pipes with nitrogen is called the "nitrogen gas blow."

  This is the basic method that is used for brazing work.

CAUTION

1. Nitrogen gas must be used. (Oxygen, carbon dioxide, and fluorocarbons cannot be used.)
2. Always be sure to use a pressure-reducing valve.

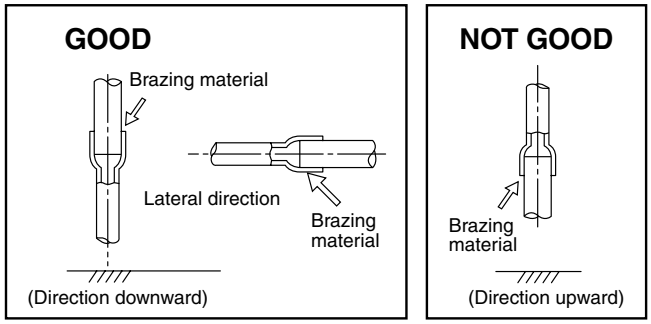




5-10. Brazing Work

1. Brazing work should be performed downwards or sideways. Avoid brazing upwards (in order to avoid incomplete brazing). (Recommendation)
2. Always used the specified piping materials for liquid pipes and gas pipes, and make sure that they are installed in the proper direction and at the proper angle.
3. The “nitrogen gas blow” method should be used when brazing.

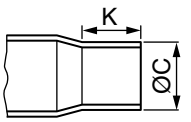
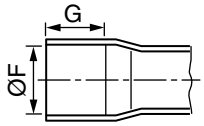
(Recommended brazing)



CAUTIONS

1. Pay attention to fire prevention concerns. (Take preventative measures in the area where brazing work is to be performed, such as keeping a fire extinguisher or water handy.)
2. Be careful not to burn yourself.
3. Make sure that any gaps between pipes and couplings are appropriate. (Do not miss brazing any joints.)
4. Make sure that pipes are adequately supported.
   - The following table provides basic guidelines for the interval between supports for horizontal copper pipe.

Coupling size of brazed pipe

Connected section	
External size	Internal size
	

Interval between supports for copper pipe

Nominal dia.	20 or less	25 to 40
Max. interval (m)	1.0	1.5

- Avoid securing copper pipes with metal brackets directly.

(Unit: mm)

Standard outer dia. of connected copper pipe	Connected section				Oval value	Min. thickness of coupling
	External size	Internal size	Min. depth of insertion			
	Standard outer dia. (Allowable difference)					
	C	F	K	G		
6.35	6.35 (±0.03)	6.45 $(^{+0.04}_{-0.02})$	7	6	0.06 or less	0.50
9.52	9.52 (±0.03)	9.62 $(^{+0.04}_{-0.02})$	8	7	0.08 or less	0.60
12.70	12.70 (±0.03)	12.81 $(^{+0.04}_{-0.02})$	9	8	0.10 or less	0.70
15.88	15.88 (±0.03)	16.00 $(^{+0.04}_{-0.02})$	9	8	0.13 or less	0.80
19.05	19.05 (±0.03)	19.19 $(^{+0.03}_{-0.03})$	11	10	0.15 or less	0.80
22.22	22.22 (±0.03)	22.36 $(^{+0.03}_{-0.03})$	11	10	0.16 or less	0.82
28.58	28.58 (±0.04)	28.75 $(^{+0.06}_{-0.02})$	13	12	0.20 or less	1.00
34.92	34.90 (±0.04)	35.11 $(^{+0.04}_{-0.04})$	14	13	0.25 or less	1.20

∗ Gas brazing of refrigerant pipes must be performed by personnel qualified to do so under local ordinances.

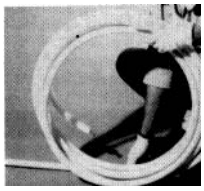
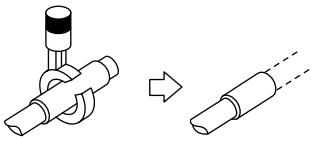
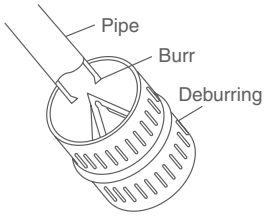
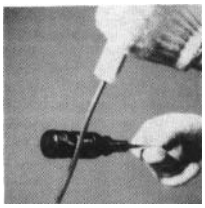
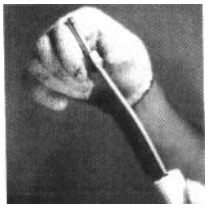
Minmum wall thickness for R410A application

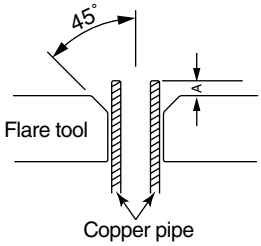
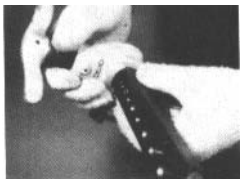
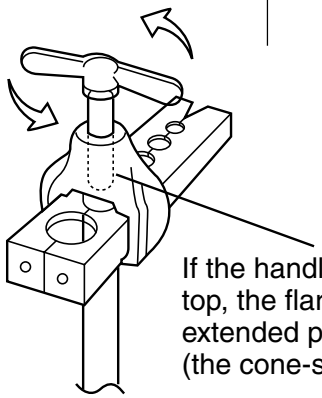
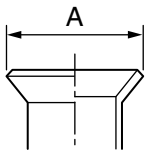
Soft (Coil)	Hard or Half hard	OD (Inch)	OD (mm)	Minium wall thickness
OK	OK	1/4	6.35	0.80
OK	OK	3/8	9.52	0.80
OK	OK	1/2	12.70	0.80
OK	OK	5/8	15.88	1.00
NG	OK	3/4	19.05	1.00
NG	OK	7/8	22.20	1.00
NG	OK	1.1/8	28.58	1.00
NG	OK	1.3/8	34.92	1.10

5-11. Flare Processing

Flare processing procedure

Parts and material : Copper pipe, flare nut. Flare nut shallbe of attached on the indoor unit or R410A exclusive.
Tools : Flare tool (“Rigid” type), reamer, pipe cutter

Work procedure	Key point	(Reason)
Straighten the coiled copper pipe. 	Uncoil the pipe.	• It is difficult to cut the coiled pipe correctly, which increases the chance of failure.
Cut the pipe with the pipe cutter. 	1. Position the blade of the cutter so that it will cut the pipe at a perpendicular angle. 2. Rotate the pipe cutter to the left to cut the pipe. 3. Move the pipe cutter slowly.	• The cut surface will be at an angle. • The cutter will bite too tightly. • The copper pipe will be deformed.
Use the reamer to remove burrs from the cut surface of the pipe. 	1 . Keep the opening of the pipe facing downwards. 2. Be careful not to scratch the inner surface of the pipe.	• Scraps will get inside of the pipe. • A gas leak could result.
Clear out the inside of the pipe by tapping on the end with a screwdriver. 	Make sure that all scraps of metal are out of the tube by lightly tapping on the tube while the opening is pointing down.	• Metal scraps in the tube can damage the compressor. • If the scraps adhere to the flared region, a gas leak may result.
Insert the flare nut. 	Be certain to insert the flare nut before beginning the flare process.	• The flare nut will not fit inside the copper pipe after the flare process.

Work procedure	Key point	(Reason)
Attach the ("Rigid") flare tool to the copper pipe. 	1. Make sure that the inner surfaces of the flare tool are clean. 2. Determine the dimensions of the copper pipe in accordance with the flare tool. 	• The copper pipe will slip out while the flaring process is in progress. • The flared dimensions vary. Dimensions to end of copper tube when flared with one tool surface • **Projection margin in flaring : A (Unit : mm)** **Rigid (Clutch type)** **Imperial (Wing nut type)**
Align the punch. (Align the arrow with the line adjacent to the next hole.) 	Align the arrow on the punch with the prescribed position on the flare tool.	• If the "A" dimension is small, the flared contact surface is smaller and a gas leak becomes more likely.
Flare the pipe. 	Slowly and carefully turn the flare tool handle while it clicks, until it turns freely. Turn the handle to the left and raise it to the top.  If the handle is not raised to the top, the flare tool will scratch the extended portion of the pipe (the cone-shaped portion).	• The pipe will not be flared fully. • The extended portion of the pipe (the cone-shaped portion) will be scratched. • **Extruding margin of copper pipe with flare machining : A (Unit: mm)** 
Remove the flare tool and check the flared surface. 	**Check list :** • Is the inner surface of the flared portion equal in width and shiny? • Is the thickness of the flared portion equal? • Is the flared portion of a suitable size?	

Outer dia. of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.4	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
9.5	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
12.7	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
15.9	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

Outer dia. of copper pipe	R410A	R22
6.4	1.5 to 2.0	1.0 to 1.5
9.5	1.5 to 2.0	1.0 to 1.5
12.7	2.0 to 2.5	1.5 to 2.0
15.9	2.0 to 2.5	1.5 to 2.0

Copper pipe outer dia.	A $^{+0}_{-0.4}$
9.5	13.2
12.7	16.6
15.9	19.7

5-12. Flushing

The flushing process uses gas pressure to remove foreign matter from the inside of pipes.

Three major effects

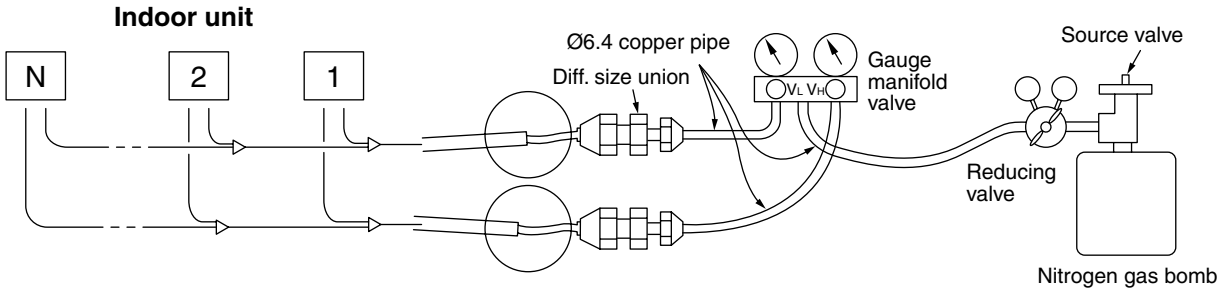
(1) Removes oxidation that formed inside of the pipe during brazing as a result of an inadequate “nitrogen gas blow” procedure.

(2) Removes foreign matter and moisture that has gotten inside of pipes due to improper handling.

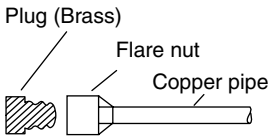
(3) Checks the connections in the pipe system between the indoor unit and the outdoor unit.

[Example work procedure]

1. Install a pressure reducing valve on a nitrogen cylinder. (Fluorocarbon gases and carbon dioxide carry a risk of promoting condensation, while oxygen causes explosion.)
2. Connect the pressure reducing valve to a gauge manifold and then to the gas-side pipe and the liquid-side pipe on the outdoor unit.



3. On the indoor unit side, plug all gas-side pipes except those for the indoor units that are to be flushed.



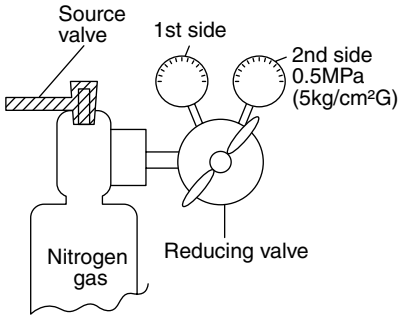
4. Open the source valve on the nitrogen cylinder and increase the pressure on the secondary side of the pressure reducing valve until it reaches 0.5MPa (5kg/cm²G), and then open the valve on the gauge manifold connected to the gas-side pipe.

5. Flushing

   Press down on the end of the indoor-side gas pipe with your palm.

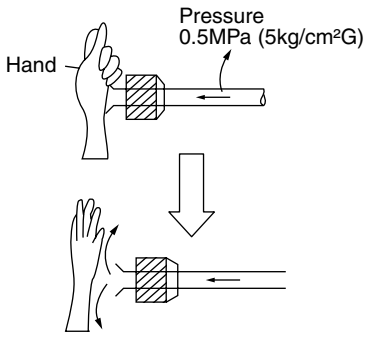
   ⬇

   When the pressure becomes so great that you can no longer hold it against the end of the pipe, remove your hand from the pipe. (This is the first flush.) Press down against the end with your hand again.



   ⬇

   Flush the pipe a second time.
   (When flushing, place a piece of gauze, etc., on the end of the pipe, and then check the gauze for debris or moisture. Repeat the flushing process until nothing more comes out of the pipe.)



6. Close the gauge manifold valve, and repeat the above process for next indoor unit (No. 2 to No. N). Close the gauge manifold valve, open the valve on the gauge manifold that is connected to the liquid-side pipe to allow the nitrogen to flow, and flush that liquid-side pipe.

5-13. Pipe Connections to the Indoor Unit

1. Once you remove the flare nut from the pipe on the indoor unit (always use a torque wrench), a small amount of gas will escape, but this is simply nitrogen gas with atmospheric pressure that was sealed inside to prevent corrosion, and does not indicate a problem.

2. Flare the pipe according to the procedure described previously.

3. Centering

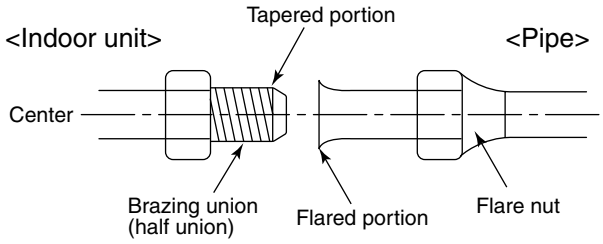
   Center the pipes be seating the tapered portion of the half union in the flared portion of the pipe.

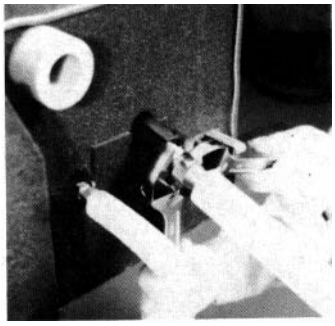
4. Tightening the flare nut

   First hand-tighten the flare nut as much as possible, and then use a torque wrench to tighten the nut completely.

Connecting pipe outer dia. (mm)	Tightening torque (N•m)
Ø6.4	14 to 18 (1.4 to 1.8 kgf•m)
Ø9.5	34 to 42 (3.4 to 4.2 kgf•m)
Ø12.7*	50 to 62 (5.0 to 6.2 kgf•m)
Ø15.9*	68 to 82 (6.8 to 8.2 kgf•m)

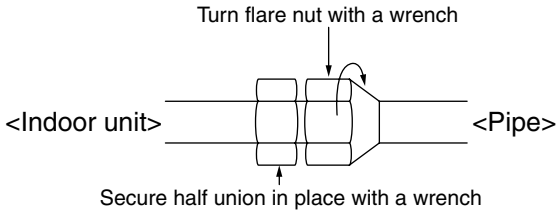
* : R410A torque wrench required.





Tightening the flare nut with a torque wrench

<Two spanners>



* Avoid initially tightening the nut with a wrench.
* When tightening a 6.4mm-diameter pipe, tighten the nut lightly with a wrench, and then tighten the nut about 90° to 120° (1.5 to 2 corners of the nut) with a torque wrench.

5-14. Pipe Connection to the Outdoor Unit

⚠ WARNING

If the refrigerant gas leaks during installation work, ventilate the room.

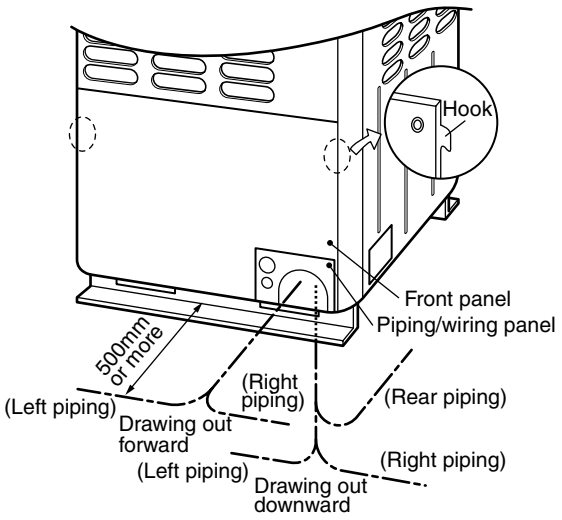
If the leaked refrigerant gas comes to contact with a fire, the noxious gas may generate.

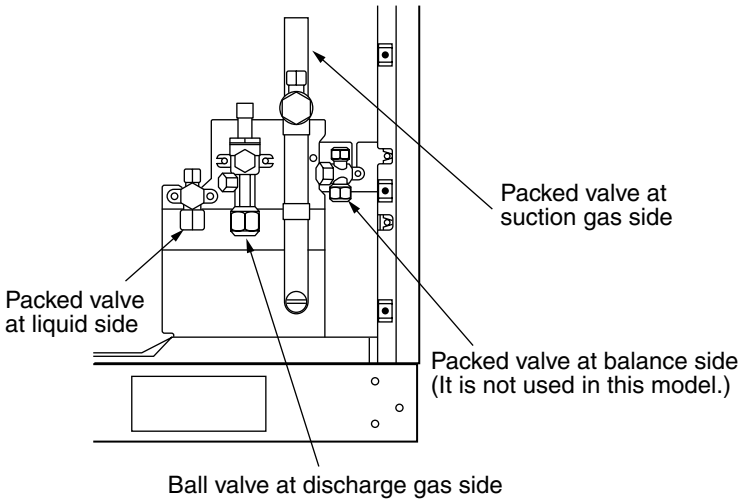
After installation work, check that the refrigerant gas does not leak.

If the refrigerant gas leaks in the room and comes to contact with a fire such as fan heater, stove, or kitchen range, the noxious gas may generate.

Connection of refrigerant pipe

1. The refrigerant pipe connecting section is set in the outdoor unit. Remove the front panel and the piping/wiring panel. (M5: 9 pcs.)
   - As shown in the right figure, the hooking hooks are attached at right and left sides each on the front panel. Lift up and remove the front panel.
2. Pipes can be drawn out forward and downward from the outdoor unit.
3. When drawing out the pipe forward, draw out the pipe to outside via piping/wiring panel, and keep space of 500mm or more from the main pipe connecting the outdoor unit with the indoor unit, considering service work, etc. (For replacing the compressor, 500mm or more space is required.)
4. When drawing out the pipe downward, remove the knockout of the base plate of the outdoor unit, apply the pipe to outside of the outdoor unit, and perform piping at right/left or rear side. Leading pipe of the balancing should be within 4m.




Packed valve at suction gas side
Packed valve at liquid side
Packed valve at balance side
(It is not used in this model.)
Ball valve at discharge gas side

REQUIREMENT

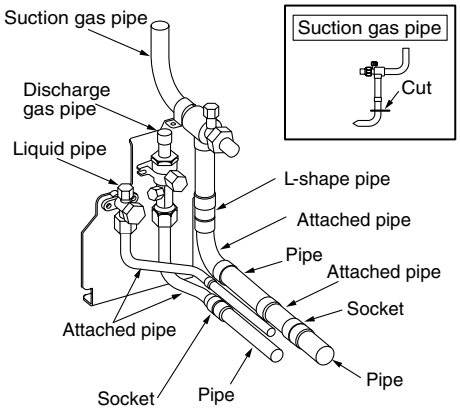
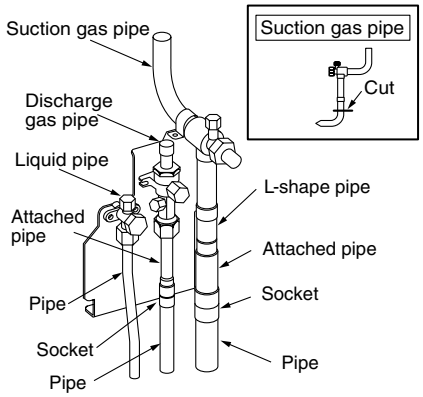
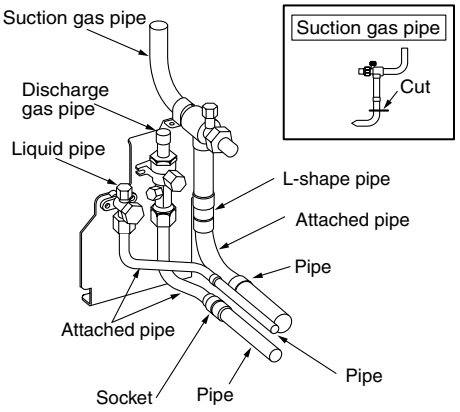
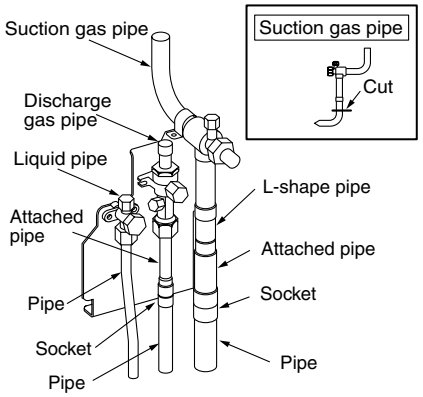
For brazing, be sure to use nitrogen gas to avoid oxidation of pipe inside.

1. In a welding work for the refrigerant pipes, be sure to use the nitrogen gas in order to prevent oxidation inside of the pipes; otherwise clogging of the refrigerating cycle due to oxidized scale generates.
2. Use clean and new pipes for the refrigerant pipes and perform piping work so that water or dust is not mixed.
3. Be sure to use a double spanner to loosen or tighten the flare nut. If a single spanner is used, a required tightening cannot be obtained. Tighten the flare not with the specified torque.

Outer dia. of copper pipe	Tightening torque (N•m)
12.7 mm	50 to 62 (5.0 to 6.2 kgf-m)
15.9 mm	68 to 82 (6.8 to 8.2 kgf-m)

Pipe connecting method of valve (Example)

Using the attached pipes as shown in the following figure, braze elbows, sockets, and pipes which are procured locally.

<table>
<tr><th>MMY-</th><th></th><th>Drawing out forward</th><th>Drawing out downward</th></tr>
<tr><td rowspan="4">MAP0802FT8
MAP1002FT8</td><td>Liquid pipe</td><td>Use the attached pipe for connection.</td><td>Pipe connection at the local site
(Bend rightward slightly.)</td></tr>
<tr><td>Discharge gas pipe</td><td>Use the attached pipe (L-shape) and connect it with socket.</td><td>Use the attached pipe (Straight pipe) and connect it with socket.</td></tr>
<tr><td>Suction gas pipe</td><td>Cut L-shape pipe and connect it with elbow, attached pipe and socket.</td><td>Cut L-shape pipe and connect it with attached pipe and socket.</td></tr>
<tr><td></td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="4">MAP1202FT8</td><td>Liquid pipe</td><td>Use the attached pipe for connection.</td><td>Pipe connection at the local site
(Bend rightward slightly.)</td></tr>
<tr><td>Discharge gas pipe</td><td>Use the attached pipe and connect it with socket.</td><td>Use the attached pipe (Straight pipe) and connect it with socket.</td></tr>
<tr><td>Suction gas pipe</td><td>Cut L-shape pipe and connect it with attached pipe.</td><td>Cut L-shape pipe and connect it with attached pipe and socket.</td></tr>
<tr><td></td><td> 
</td><td> 
</td></tr>
</table>

5-15. Leak Test

A leak test must be performed when connecting pipes to the refrigerant pipes in use at a site.

[1] Leak test pressure

For Super HRM air conditioner systems: 3.73MPa (38kg/cm²G)

[2] Test method

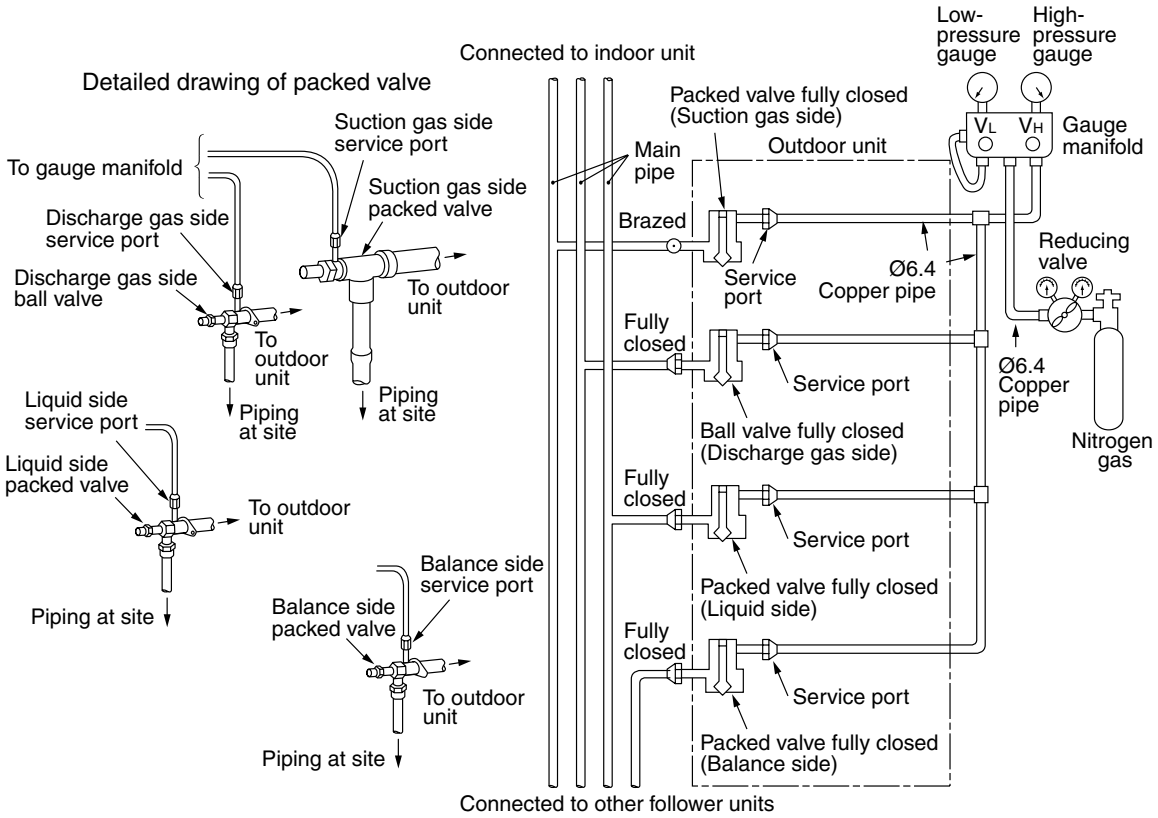
After the refrigerant piping has finished, execute an airtight test. For an airtight test, connect a nitrogen gas bomb as shown in the figure below, and apply pressure.

- Be sure to apply pressure from the service ports of the packed valves (or ball valves) at liquid side, discharge gas side, suction gas side, and balance pipe side.
- An airtight test can be only performed to the service ports at liquid side, discharge gas side, suction gas side, and balance pipe side of the outdoor unit.
- Close fully valves at liquid side, discharge gas side, suction gas side, and balance pipe side. As there is possibility that nitrogen gas enters in the refrigerant cycle, re-tighten the valve rods before applying pressure. (Re-tightening of the valve rods are unnecessary for valves at discharge gas side because they are ball valves.)
- For each refrigerant line, apply pressure gradually with steps at liquid side, discharge gas side, suction gas side, and balance pipe side.

Be sure to apply pressure to suction gas side, discharge gas side, liquid side, and balance pipe side.

REQUIREMENT

Never use “Oxygen”, “Flammable gas” and “Noxious gas” in an airtight test.



STEP 1 : Apply pressure 0.3MPa (3.0kg/cm²G) for 3 minutes or more.
STEP 2 : Apply pressure 1.5MPa (15kg/cm²G) for 3 minutes or more. } Available to detect a gross leakage

STEP 3 : Apply pressure 3.73MPa (38kg/cm²G) for approx. 24 hours. Available to detect slow leakage

- Check pressure down.

  No pressure down: Accepted Pressure down: Check the leaked position.

  (However, if there is difference of ambient temp. between when pressure has been applied and when 24 hours passed, pressure changes by approx. 0.01MPa (0.1kg/cm²G) per 1°C. Correct the pressure.)

Leaked position check

When a pressure-down is detected in STEP 1, STEP 2, or STEP 3, check the leakage at the connecting points. Check leakage with hearing sense, feeler, foaming agent, etc, and perform re-brazing or re-tightening of flare if leakage is detected.

NOTES

If piping is long, an airtight test is performed for each divided block.

1) Indoor side + vertical pipe
2) Indoor side + vertical pipe + outdoor side

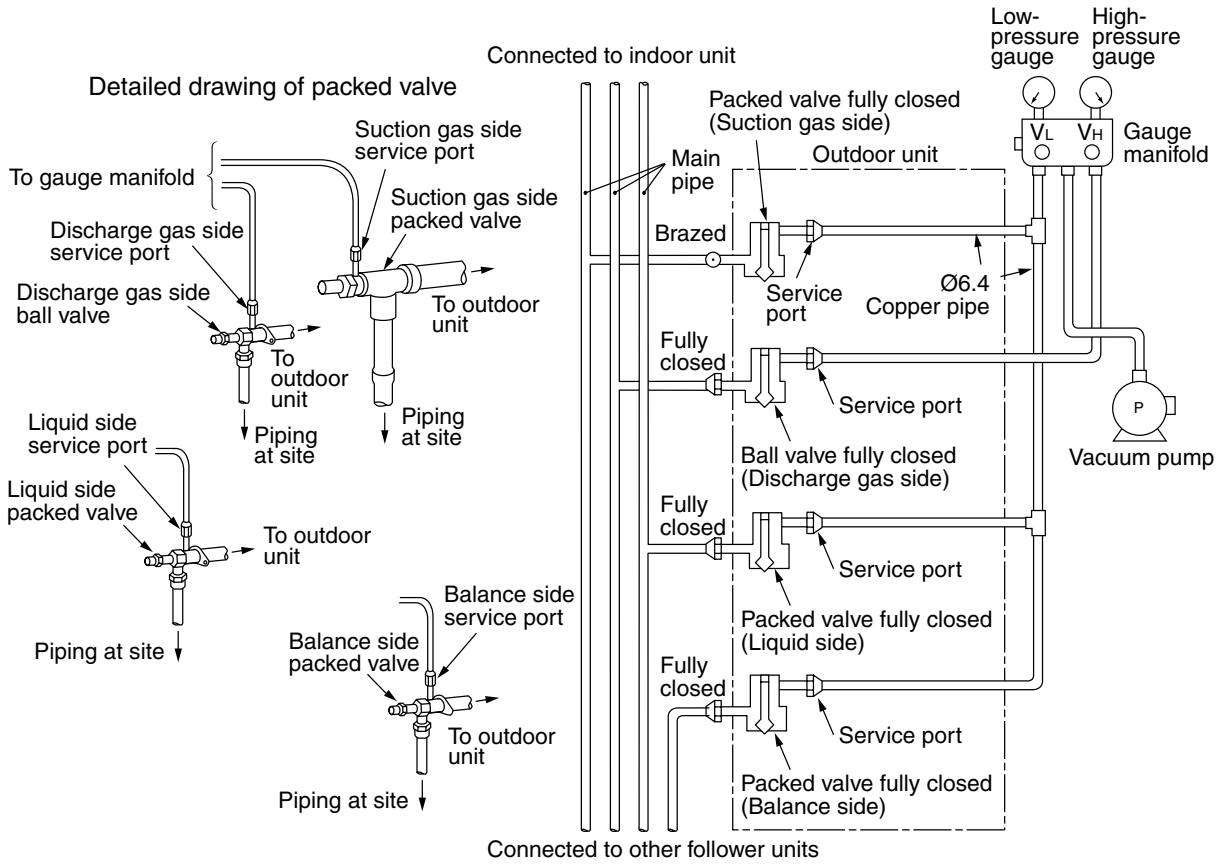
[3] Air purge

For the air purge at installation time (Discharge of air in connecting pipes), use "**Vacuum pump method**" from viewpoint of protection of earth environment.

- For protection of earth environment, do not discharge the flon gas in the air.
- Using a vacuum pump, eliminate the remained air (nitrogen gas, etc.) in the unit. If gas remains, an absence of faculties may be caused.

After the airtight test, discharge nitrogen gas. Then connect the gauge manifold to the service ports at balance, liquid, suction gas, and discharge gas sides, and connect the vacuum pump as shown in the following figure. Be sure to perform vacuuming for balance, liquid, suction gas and discharge gas sides.

- Be sure to perform vacuuming from liquid balance, suction gas, and discharge gas sides.
- Be sure to use a vacuum pump with counter-flow preventive function so that oil in the pump does not back up in the pipe of the air conditioner while the pump stops. (If oil in the vacuum pump enters in the air conditioner with R410A refrigerant, a trouble is caused in the refrigerating cycle.)



- Use a vacuum pump having a high vacuuming degree (below -755mmHg) and a large exhaust gas amount (over 40L/minute).
- Perform vacuuming for 2 or 3 hours though time differs due to pipe length. In this time, check all packed valves at liquid, suction gas, and discharge gas sides are fully closed.
- If vacuuming valve amount is not decreased to below -755mmHg even after vacuuming for 2 hours or more, continue vacuuming for 1 hour or more. If -755mmHg or less cannot be obtained by 3 hours or more vacuuming, check the leaked position.
- When vacuuming valve reached to -755mmHg or less after vacuuming for 2 hours or more, close valves VL and VH of the gauge manifold fully, stop the vacuum pump, leave it as it is for 1 hour, and then check the vacuuming degree does not change. If it changed, there may be a leaked position. Check the leaked position.
- After the above procedure of vacuuming has finished, exchange the vacuum pump with a refrigerant cylinder and advance to the additional charging of refrigerant.

5-16. Charging Requirement with Additional Refrigerant

After the system has been vacuumed, replace the vacuum pump with a refrigerant cylinder and charge the system with additional refrigerant.

Calculating the amount of additional refrigerant required

HFC
R410A

Refrigerant in the system when shipped from the factory

		8HP	10HP	12HP
Refrigerant amount charged in factory	Heat recovery model	11.5kg	11.5kg	11.5kg

When the system is charged with refrigerant at the factory, the amount of refrigerant needed for the pipes at the site is not included. Calculate the additional amount needed, and add that amount to the system.

(Calculation)

Additional refrigerant charge amount is calculated from size of liquid pipe at site and its real length.

[Additional refrigerant charge amount at site] =
[Real length of liquid pipe] × [Additional refrigerant charge amount per liquid pipe 1m **(Table 1)**] × 1.3 + [Compensation by system HP **(Table 2)**]

Example : Additional charge amount R (kg) = {(L1 x 0.025kg/m) + (L2 x 0.055kg/m) + (L3 x 0.105kg/m) + (L4 x 0.160kg/m) + (L5 x 0.250kg/m)} x 1.3

L1 : Real total length of liquid pipe Ø6.4 (m)
L2 : Real total length of liquid pipe Ø9.5 (m)
L3 : Real total length of liquid pipe Ø12.7 (m)
L4 : Real total length of liquid pipe Ø15.9 (m)
L5 : Real total length of liquid pipe Ø19.1 (m)
System : 24HP

Table 1

Pipe dia. at liquid side	Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.1	Ø22.2
Additional refrigerant amount/1m	0.025kg	0.055kg	0.105kg	0.160kg	0.250kg	0.350kg

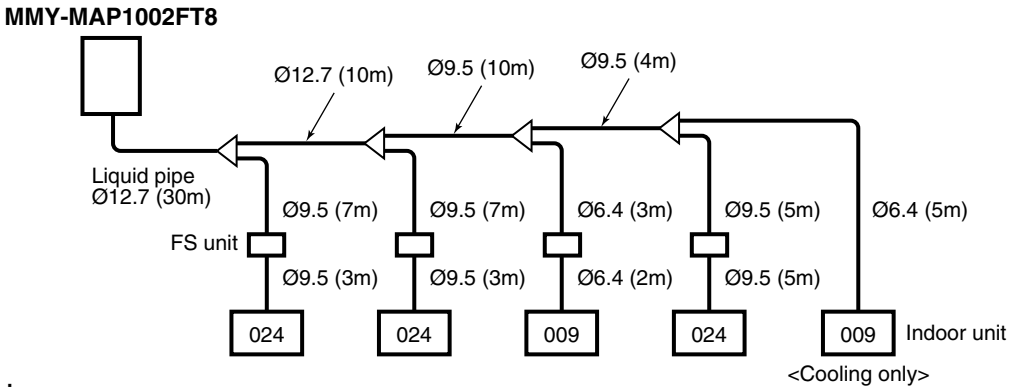
Table 2

Combined horse power (HP)	**Outdoor combination (HP)**			**Compensation by system HP (kg)**
8	8			2.0
10	10			2.5
12	12			3.0
16	8	8		-1.5
18	10	8		0.0
20	10	10		2.0
24	8	8	8	-4.5
26	10	8	8	-3.0
28	10	10	8	-1.5
30	10	10	10	0.0

Refrigerant charging

- Keeping valve of the outdoor unit closed, be sure to charge liquid refrigerant from service port at liquid side.
- If the specified amount of refrigerant cannot be charged, open fully valves of outdoor unit at liquid, suction gas, and discharge gas sides, perform cooling operation under condition that valve at suction gas side returns to close side a little, and then charge refrigerant into service port at suction gas side. In this time, choke the refrigerant slightly by operating valve of the bomb to charge refrigerant. The liquid refrigerant may be charged suddenly, therefore be sure to charge refrigerant gradually.
- When refrigerant leaks and shortage of refrigerant generates, recover refrigerant in the system and recharge new refrigerant up to the correct level.

<Example of calculation>



Liquid pipe :

Ø6.4 = 3 + 2 + 5 = 10m

Ø9.5 = 10 + 4 + 7 + 3 + 7 + 3 + 5 + 5 = 44m

Ø12.7 = 30 + 10 = 40m

Compensation by system HP = 2.5kg (10HP)

R = {(10m x 0.025kg/m) + (44m x 0.055kg/m) + (40m x 0.105kg/m)} × 1.3 + 2.5= 11.43kg

REQUIREMENT

<Entry of refrigerant charge amount>

- Fill the additional refrigerant record column of the wiring diagram indication plate with the additional refrigerant amount at installation work, total refrigerant amount and the name of the service man who charged refrigerant at installation time.
- The total refrigerant amount means the total value of the refrigerant amount at shipment and the additional refrigerant amount at installation time. The refrigerant amount at the shipment is one described on the “Unit nameplate”.

Chart of additional refrigerant charging amount

Unit [kg]

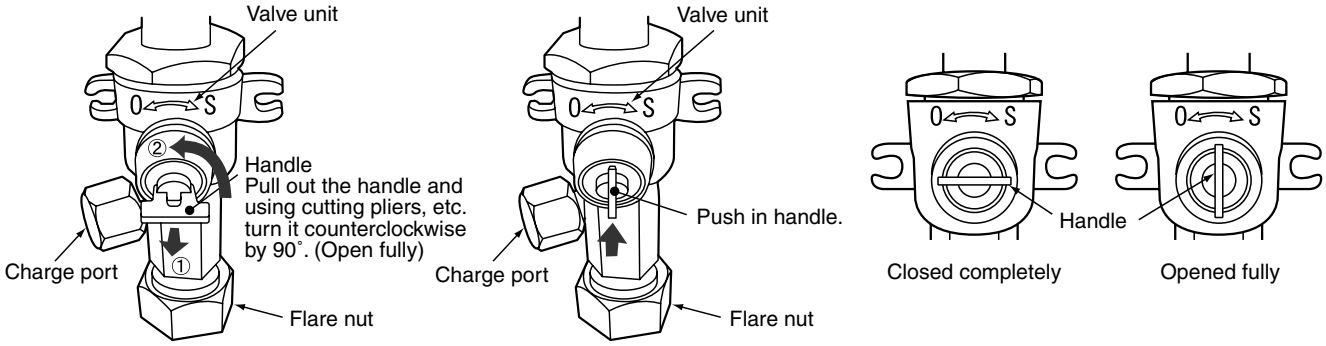
Actual piping length (m)	Pipe size (Liquid pipe)					
	Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.1	Ø22.2
1	0.025	0.055	0.105	0.160	0.250	0.350
2	0.050	0.110	0.210	0.320	0.500	0.700
3	0.075	0.165	0.315	0.480	0.750	1.050
4	0.100	0.220	0.420	0.640	1.000	1.400
5	0.125	0.275	0.525	0.800	1.250	1.750
6	0.150	0.330	0.630	0.960	1.500	2.100
7	0.175	0.385	0.735	1.120	1.750	2.450
8	0.200	0.440	0.840	1.280	2.000	2.800
9	0.225	0.495	0.945	1.440	2.250	3.150
10	0.250	0.550	1.050	1.600	2.500	3.500
11	0.275	0.605	1.155	1.760	2.750	3.850
12	0.300	0.660	1.260	1.920	3.000	4.200
13	0.325	0.715	1.365	2.080	3.250	4.550
14	0.350	0.770	1.470	2.240	3.500	4.900
15	0.375	0.825	1.575	2.400	3.750	5.250
16	0.400	0.880	1.680	2.560	4.000	5.600
17	0.425	0.935	1.785	2.720	4.250	5.950
18	0.450	0.990	1.890	2.880	4.500	6.300
19	0.475	1.045	1.995	3.040	4.750	6.650
20	0.500	1.100	2.100	3.200	5.000	7.000
21	0.525	1.155	2.205	3.360	5.250	7.350
22	0.550	1.210	2.310	3.520	5.500	7.700
23	0.575	1.265	2.415	3.680	5.750	8.050
24	0.600	1.320	2.520	3.840	6.000	8.400
25	0.625	1.375	2.625	4.000	6.250	8.750
26	0.650	1.430	2.730	4.160	6.500	9.100
27	0.675	1.485	2.835	4.320	6.750	9.450
28	0.700	1.540	2.940	4.480	7.000	9.800
29	0.725	1.595	3.045	4.640	7.250	10.150
30	0.750	1.650	3.150	4.800	7.500	10.500

Actual piping length (m)	Pipe size (Liquid pipe)					
	Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.1	Ø22.2
31	0.775	1.705	3.255	4.960	7.750	10.850
32	0.800	1.760	3.360	5.120	8.000	11.200
33	0.825	1.815	3.465	5.280	8.250	11.550
34	0.850	1.870	3.570	5.440	8.500	11.900
35	0.875	1.925	3.675	5.600	8.750	12.250
36	0.900	1.980	3.780	5.760	9.000	12.600
37	0.925	2.035	3.885	5.920	9.250	12.950
38	0.950	2.090	3.990	6.080	9.500	13.300
39	0.975	2.145	4.095	6.240	9.750	13.650
40	1.000	2.200	4.200	6.400	10.000	14.000
41	1.025	2.255	4.305	6.560	10.250	14.350
42	1.050	2.310	4.410	6.720	10.500	14.700
43	1.075	2.365	4.515	6.880	10.750	15.050
44	1.100	2.420	4.620	7.040	11.000	15.400
45	1.125	2.475	4.725	7.200	11.250	15.750
46	1.150	2.530	4.830	7.360	11.500	16.100
47	1.175	2.585	4.935	7.520	11.750	16.450
48	1.200	2.640	5.040	7.680	12.000	16.800
49	1.225	2.695	5.145	7.840	12.250	17.150
50	1.250	2.750	5.250	8.000	12.500	17.500
51	1.275	2.805	5.355	8.160	12.750	17.850
52	1.300	2.860	5.460	8.320	13.000	18.200
53	1.325	2.915	5.565	8.480	13.250	18.550
54	1.350	2.970	5.670	8.640	13.500	18.900
55	1.375	3.025	5.775	8.800	13.750	19.250
56	1.400	3.080	5.880	8.960	14.000	19.600
57	1.425	3.135	5.985	9.120	14.250	19.950
58	1.450	3.190	6.090	9.280	14.500	20.300
59	1.475	3.245	6.195	9.440	14.750	20.650
60	1.500	3.300	6.300	9.600	15.000	21.000

<Full opening of the valve>

- Open valve of the outdoor unit fully.
- Using 4mm-hexagonal wrench, open fully the valve rods at liquid side.
- Using a spanner, etc, open fully the valve rod of packed valve at suction gas side.
- Using the pinchers, open fully the handle of the ball valve at discharge gas side.
  Be careful that handling of ball valve differs from that of packed valve.

How to open the ball valve at discharge gas side



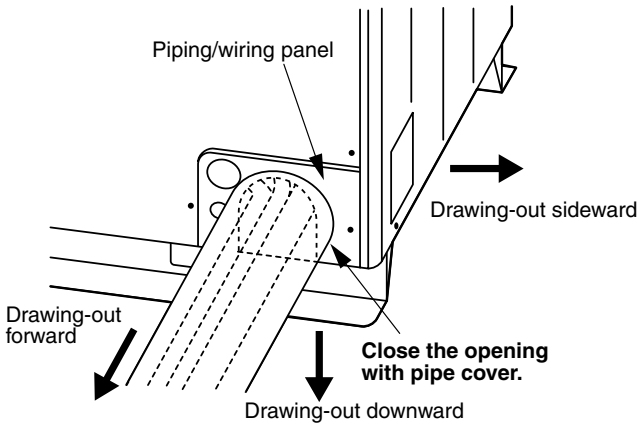
<Heat insulation for pipe>

- Apply heat insulation of pipe separately at liquid, suction gas, and discharge gas sides.
- Be sure to use thermal insulator with heat-resisting temp. 120°C or more.

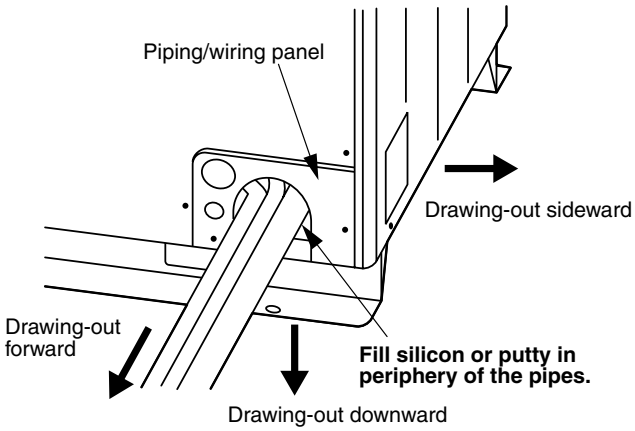
⚠ CAUTION

- After piping connection work has finished, cover the opening of the piping/wiring panel with the piping cover, or fill silicon or putty in space of the pipes.
- In case of drawing-out the pipes downward or sideward direction, also close the openings of the base plate and the side plate.
- Under the opened condition, a trouble may be caused due to entering of water or dust.

In case of using pipe cover



In case of using no pipe cover



• Check the additional amount of refrigerant.

<Check list>

Calculate the additional amount of refrigerant from the additional amount of refrigerant (A) by the pipe diameter at liquid side and the pipe length to be connected and multiply the specific number.

$$\text{Additional amount of refrigerant} = \underbrace{\left\{\begin{array}{l}\text{Real liquid}\\ \text{pipe length}\end{array}\right. \times \left.\begin{array}{l}\text{Additional amount of}\\ \text{refrigerant per liquid pipe 1m}\end{array}\right\}}_{\text{(A)}} \times 1.3 + \underbrace{\left\{\begin{array}{l}\text{Compensation by}\\ \text{system HP}\end{array}\right\}}_{\text{(C)}}$$

Firstly enter the total length for each liquid pipe in the following table, and then calculate the additional amount of refrigerant by pipe length.

<Additional amount of refrigerant by pipe length>

Pipe dia at liquid side	Standard amount of refrigerant kg/m	Total pipe length at each liquid side	Additional amount of refrigerant pipe dia at each liquid side kg
Ø6.4	0.025 ×	=	Kg
Ø9.5	0.055 ×	=	Kg
Ø12.7	0.105 ×	=	Kg
Ø15.9	0.160 ×	=	Kg
Ø19.1	0.250 ×	=	Kg
Ø22.2	0.350 ×	=	Kg
		Additional amount of refrigerant by pipe length (A)	Kg

Next, refer to the following table for compensation by system HP (C).

<Additional amount of refrigerant>

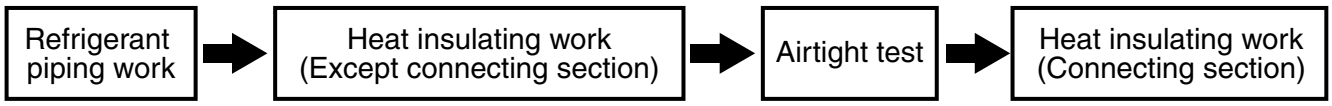
Additional amount of refrigerant by pipe length (A)	Kg
Compensation by HP (C)	Kg
Additional amount of refrigerant ((A) × 1.3) + (C)	Kg

<Compensation by system HP>

System Horse power (HP)	Outdoor combination (HP)			Compensation by system HP (Kg)
8	8			2.0
10	10			2.5
12	12			3.0
16	8	8		–1.5
18	10	8		0.0
20	10	10		2.0
24	8	8	8	–4.5
26	10	8	8	–3.0
28	10	10	8	–1.5
30	10	10	8	0.0

5-17. Insulation Work

Work procedure


Refrigerant piping work
Heat insulating work (Except connecting section)
Airtight test
Heat insulating work (Connecting section)

Material

Use material withstanding sufficiently to temperature of pipe for the heat insulator.

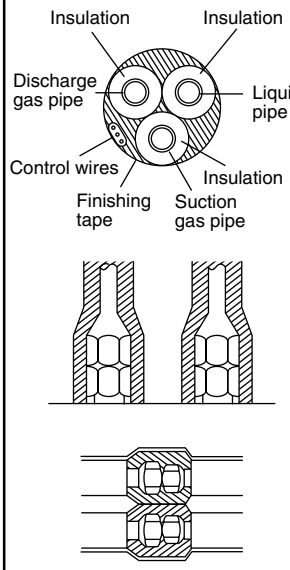
Example : Heat insulating polyethylene foam (Heat insulating 120°C or more)

Insulation guidelines

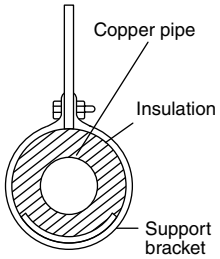
All insulation work for brazed joints, flared joints, etc., should be performed only after successfully passing the leak test. Suction gas pipes, discharge gas pipes and liquid pipes must be insulated separately in Super HRM air conditioning system.

Examples of Correct Insulation

[Insulating both a gas pipe and a liquid pipe]

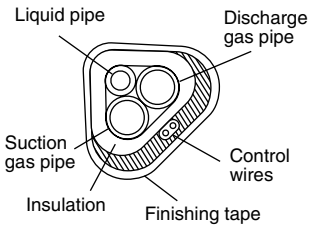


[Insulating supported sections]

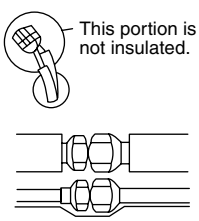


Examples of Incorrect Insulation

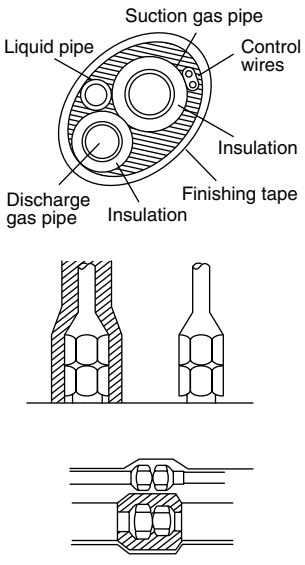
• Gas pipes and liquid pipes cannot be insulated simultaneously.



• Insulate all joints adequately.

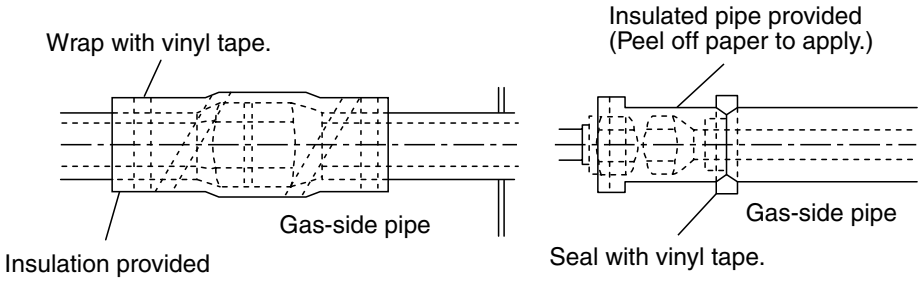


[Insulating just a gas pipe]

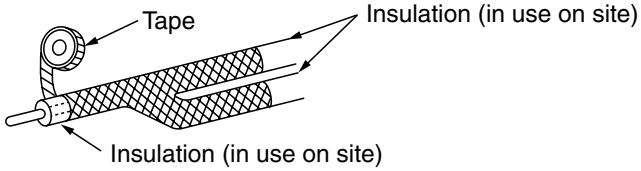


CAUTION

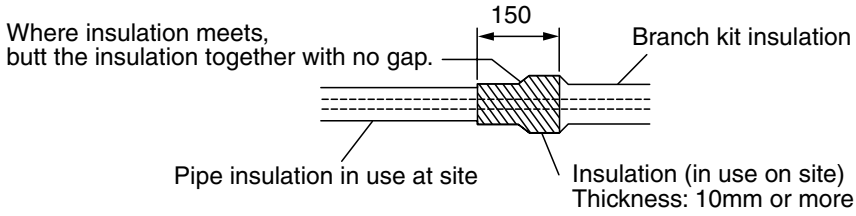
(1) Use the insulating material provided to insulate the indoor unit pipe connection (union and flare nut).



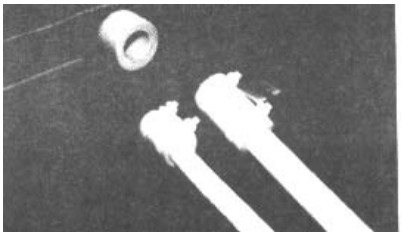
(2) When insulating branch joints, align the insulating material that was provided with the branch kit with the pipe on site and tape the insulation in place.



Where the insulation that is provided with the branch kit meets the insulation that is in use on the site, butt the ends of the insulation together so that there is no gap and install the insulation as illustrated below, and then tape the insulation in place.


150
Where insulation meets,
butt the insulation together with no gap.
Branch kit insulation
Pipe insulation in use at site
Insulation (in use on site)
Thickness: 10mm or more

(3) If it is likely that heat will build up in the ceiling (examples: inside a slate roof, or inside a ceiling with air that is basically outside air), refrigerant pipes should be insulated with 8 to 10 mm of normal insulation, encased in fiberglass insulation (16 to 20kg/m^3) that is at least 10mm thick.



Insulating material that is provided for use on pipe connections at the indoor unit.

5-18. Reference for Insulation Work

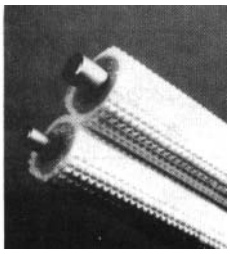
Reference

Sometimes, copper pipe with insulated sheathing is used in order to save labor. The following reference applies to this type of pipe.

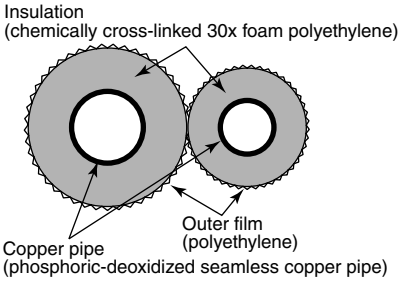
■ Types and Characteristics of Copper Pipe with Insulated Sheathing

• Insulation: 8 to 10mm

<Pair coil>



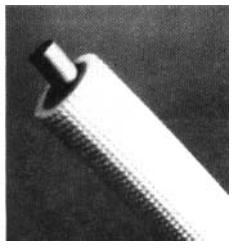
Pair coil

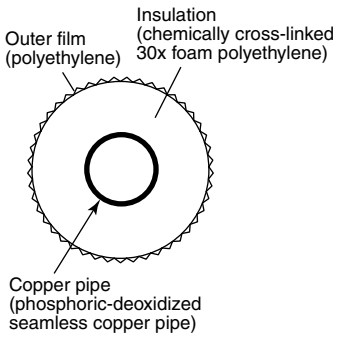


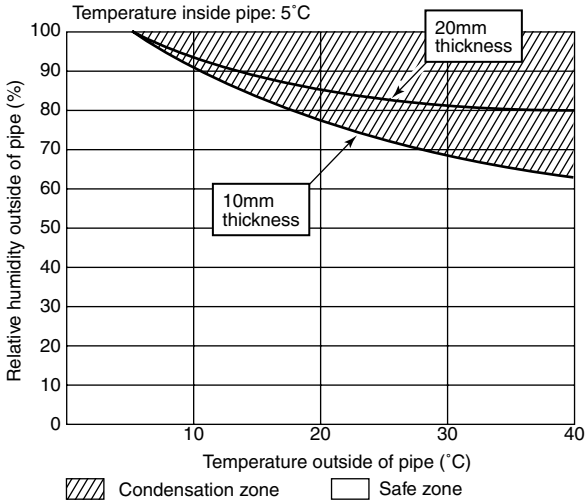
	Copper pipe (mm) (Outer dia. × thickness)	Coil length (m)	Heat insulator (mm)		Heat insulator (mm)	
			Outer dia.	Thickness	Outer dia.	Thickness
Soft Hard Half hard	6.35 × 0.8	20	24	8	48	20
	9.52 × 0.8		27	8	51	20
	6.35 × 0.8	20	24	8		
	12.70 × 0.8		34	10	54	20
	6.35 × 0.8	20	24	8		
	15.88 × 1.0		37	10		
	9.52 × 0.8	20	27	8		
	15.88 × 1.0		37	10	57	20
Hard Half hard	19.05 × 1.0	—	—	—	61	20
	22.22 × 1.0	—	—	—	64	20
	28.6 × 1.0	—	—	—	68	20
	34.9 × 1.1	—	—	—	76	20

■ Condensation characteristics (Temperature inside pipe: 5°C, copper pipe 15.88mm)

• Insulation: 20mm







■ Example uses for different thicknesses of insulation

Insulating material	Example use
10mm	When pipe is indoors, and a small amount of condensation under certain conditions is acceptable
20mm	When pipe is indoors, and even a small amount of condensation is unacceptable

■ Insulation characteristics

Material	Item	Specifications
Copper pipe	Material	Phosphoric-deoxidized seamless copper pipe
Insulation	Material	Chemically cross-linked 30x foam polyethylene with textured outer covering
	Temperature range	–40°C to 120°C (shrinkage: 1%)

6. INDOOR UNIT INSTALLATION

WARNING

Install the air conditioner certainly to sufficiently withstand the weight.
If the strength is insufficient, the unit may fall down resulting in human injury.
Perform a specified installation work to guard against strong wind or earthquake.
An incomplete installation can cause accidents by the units falling and dropping.

REQUIREMENT

Strictly comply with the following rules to prevent damage of the indoor units and human injury.

- Do not put a heavy article on the indoor unit. (Even units are packaged)
- Carry in the indoor unit as it is packaged if possible. If carrying in the indoor unit unpacked by necessity, be sure to use buffering cloth, etc. not to damage the unit.
- To move the indoor unit, hold the hooking metals (4 positions) only.
  Do not apply force to the other parts (refrigerant pipe, drain pan, foamed parts, or resin parts, etc.).
- Carry the package by two or more persons, and do not bundle it with PP band at positions other than specified.

6-1. Before Installation

Before starting installation and before unpacking the air conditioner, check the model name. After unpacking the unit, check the standard accessories that are packed in plastic bags together with the unit. Be sure not to throw them away with the box by mistake.

6-2. Standard Accessories

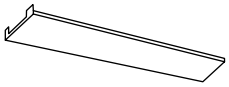
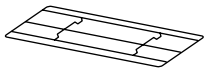
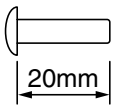
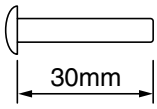
4-way air discharge cassette type

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	2	——	(Be sure to hand over customers)	Heat insulator	1		For heat insulating of drain connecting section
Heat insulating pipe	2		For heat insulating of pipe connecting section	Washer	8		For hanging down unit
Installation pattern	1	——	For confirmation of ceiling opening and main unit position	Hose band	1		For connecting drain pipe
Installation gauge	2		For positioning of ceiling position (united with installation pattern)	Flexible hose	1		For centering the drain pipe
Pattern fixing screw	4	M5 x 16ℓ	For attaching pattern	Heat insulator	1		For sealing the wire connection opening

2-way air discharge cassette type

Part name		Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual		1	——	(Be sure to hand this over customers)	Installation gauge	1		For positioning of ceiling position (United with installation pattern)
Heat insulating pipe		2		For heat insulating pipe connecting section	Pattern fixing screw	6	M5 x 16ℓ	For attaching the installation pattern
Installation pattern	MMU-AP0301WH type or lower	1	——	For checking the position of the ceiling openings and the unit	Fan motor connector	1		For changing fan motor r.p.m. to apply higher ceiling
	MMU-AP0481WH type	2			Heat insulator	1		For seal for wire connecting port

Ceiling panel components (2-way air discharge cassette type)

Name	Ceiling panel	Center panel	Air filter	Screw installing panel	Screw installing panel
Shape (Q'ty)	(1 set)	 (1 pc)	 • RBC-UW466PG : Attached to indoor unit	 20mm M5×20 ℓ (4 pcs)	 30mm M5×30 ℓ (2 pcs)
Usage	———	———	Attached to ceiling panel, and removes dust.	For fixing ceiling panel (4 corners)	For tentative hanging and fixing ceiling panel (Center part)

1-way air discharge cassette type

Part name	Q'ty AP0071YH to AP0121SH	Q'ty AP0151SH to AP0241SH	Shape	Usage	Part name	Q'ty AP0091SH to AP0121SH	Q'ty AP0151SH to AP0241SH	Shape	Usage
Installation Manual	1	1	——	(Be sure to hand over customers)	Connector	—	1		For motor speed up when installed to high ceiling
Heat Insulating pipe	2	2		For heat insulating of pipe connecting section	Banding band	—	10		Used to fix drain piping
Installation gauge	—	1		For positioning of ceiling position	Drain-up pipe	—	4		For drain-up of discharge port
Installation pattern	1	—	—	For confirmation of ceiling opening and main unit position	Pattern fixing screw	5	—	M5 x 16ℓ	For attaching pattern

Ceiling panel components (1-way air discharge cassette type)

Part name	Q'ty RBC-US135PG, 165PG, 265PG type	Use
Ceiling panel	1	———
Intake grille	3	———
Air filter	1	Installs in the intake grille and removes dust and dirt from the air.
Panel installation screw (M5 x 20)	7	For securing the ceiling panel
Screw head insulation	1 set	Prevents condensation from forming on screw heads

Concealed duct type

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	——	——	Washer	8		For hanging down the unit
Insulated pipe	2		For heat insulating pipe connecting section				

Concealed duct high static pressure type

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	——	——	Insulation	1		For insulating the liquid pipe connection
Insulation	1		For insulating the gas pipe connection				

Under ceiling type

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	This manual	(Be sure to hand over to customers)	Heat insulator	1		For heat insulation of drain connecting section
Heat insulating pipe	2		For heat insulation of pipe connecting section	Washer	4		For hanging-down unit
Installation pattern	1	—	For confirmation of ceiling opening and main unit position	Hose band	2		For connecting drain pipe
Banding band	2		For drain hose forming	Drain hose	1		For drain piping
Bushing	1		For power supply cord protection	Heat insulator	1		For sealing of piping hole

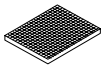
High wall type (1series)

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	This manual	(Be sure to hand over customers)	Installation pattern	1	——	Used for drilling holes and positioning for installation plate
Heat Insulating pipe	2		For heat insulating of pipe connecting section	Screw cap	4		Cover on fixing screw at side plate
Wood screw Ø5.1 x 45ℓ	12		Used to fix installation plate	Bundling band	4		Used to fix attached pipe heat insulating material
Installation plate	1		Used install indoor unit wall unit				

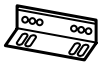
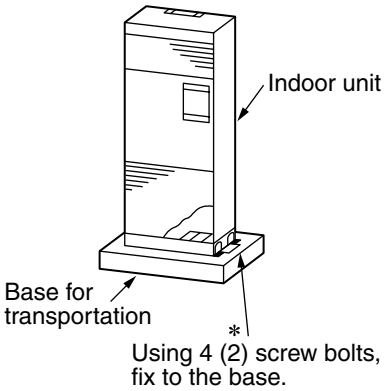
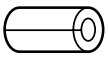
Floor standing cabinet type

Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	——		Bushing	1		For installation in the wire knockout
Heat insulation	2		For insulating the indoor unit pipe connections				

Floor standing concealed type

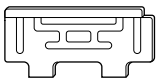
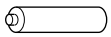
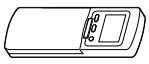
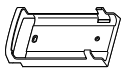
Part name	Q'ty	Shape	Use	Part name	Q'ty	Shape	Use
Installation Manual	1	——	——	Drain receiver fixing screw	1		For fix the drain receiver
Heat insulation	2		For heat insulating the indoor unit pipe connections	Drain hose	1		For water draining (Attaches to the drain receiver.)
Drain pan	1		For water draining	Heat insulated pipe	1		For insulating the drain receiver (Attaches to the drain receiver.)
Drain filter	1		Drain filter (inside the drain receiver)				

Floor standing type

Attached position	Part name	Q'ty	Shape	Stored position
Upper part of main unit	Bracket for fixing to wall	1		
Accessory bag	Installation Manual	1	These sheets	
	Thermal insulator	2		
	Screw bolt	* 4 (2)		
	Thermal insulator	2		
Lower part of main unit	Bracket for fixing to floor	2		

* Quantities in the parentheses are for MMF-AP0361, AP0481 and AP0561 models.
The brackets for fixing to the floor are already mounted to the indoor unit.

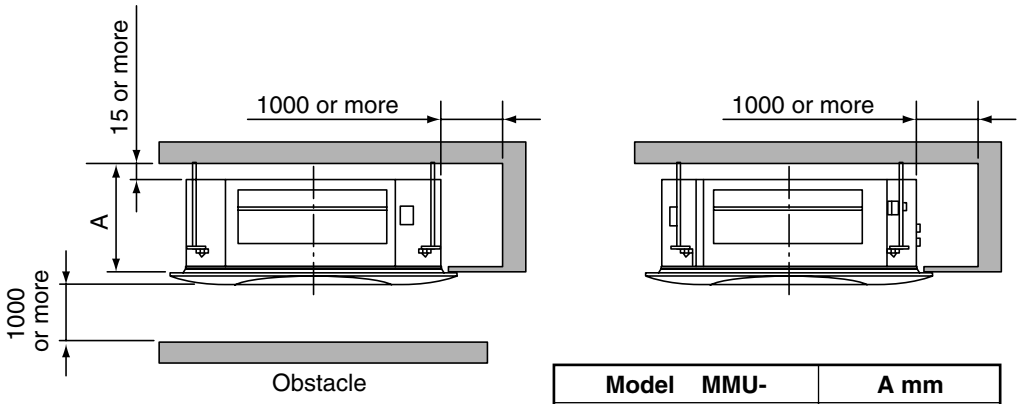
High Wall type (2 series)

Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)
1	 Installation plate × 1	3	 Battery × 2	5	Mounting screw Ø4 × 25 ℓ x 6
2	 Wireless remote controller × 1	4	 Remote controller holder × 1	6	Pan head wood screw Ø3.1 × 16 ℓ × 2

6-3. 4-Way Air Discharge Cassette Type

Installation space

Secure the specified space in the figure for installation and servicing.



Model MMU-	A mm
AP0091H to AP0301H	271 or more
AP0361H to AP0561H	334 or more

Selection of installation place

In case of continued operation of the indoor unit under high-humidity conditions as described below, dew may condense and water may drop.

Especially, high-humidity atmosphere (dew point temperature : 23°C or more) may generate dew inside the ceiling.

1. Unit is installed inside the ceiling with slated roof.
2. Unit is installed at a location using inside of the ceiling as fresh air take-in path.
3. Kitchen

If installing a unit at such place, put insulating material (glass wool, etc.) additionally on all the positions of the indoor unit which come to contact with high-humidity atmosphere.

Advice

Set a service check opening panel at right side of the unit (size: 450 x 450mm or more) for piping, maintenance, and servicing.

Ceiling height

Model MMU-	Possible installed ceiling height
AP0091H to AP0121H	Up to 2.7 m
AP0151H to AP0301H	Up to 3.8 m
AP0361H to AP0561H	Up to 4.3 m

When the height of the ceiling exceeds the distance of the item Standard/4-way in Table below, the hot air is difficult to reach the floor. Therefore, it is necessary to change the setup value of the high ceiling switch or discharge direction.

REQUIREMENT

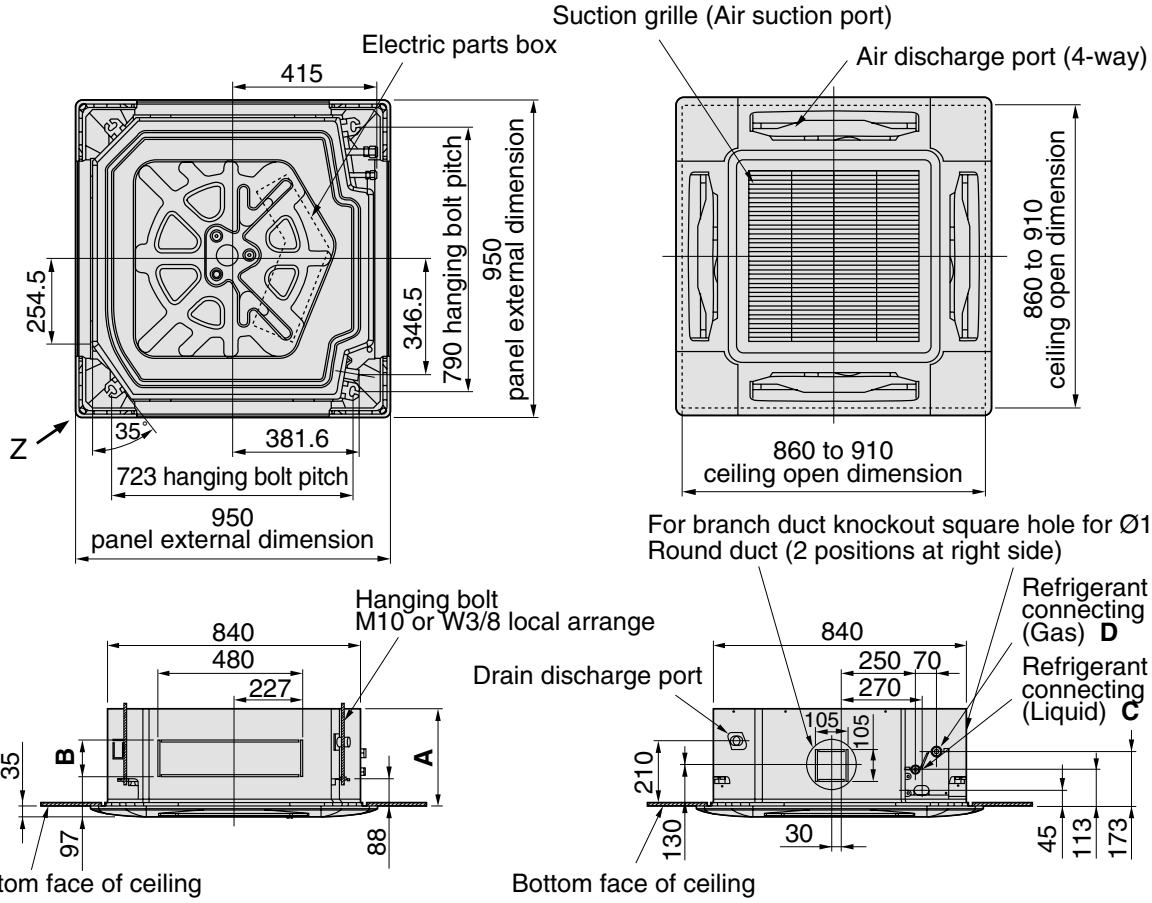
- When using the air conditioner with 2-way discharge system with the standard setting (at a shipment), it may stop abnormally in heating. Therefore, change the setting switch according to the number of discharge direction and the ceiling height.
- When using the air conditioner with 2-way/3-way discharge system, a strong wind blows directly if the ceiling height is lower than the standard. Therefore, change the setting switch according to height of the ceiling.
- When using the high ceiling (1) or (2) with 4-way discharge system, the draft is apt to be felt due to drop of the discharge temperature.

Installable ceiling

(Unit : m)

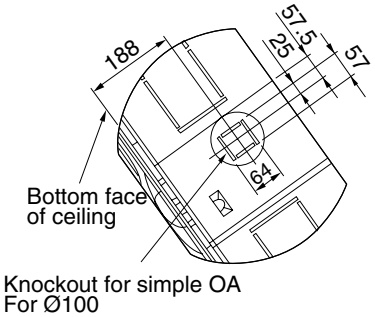
Model MMU-	AP0091H to AP0121H			AP0151H to AP0181H			AP0241H to AP0301H			AP0361H to AP0561H			High ceilong setup
No. of discharge direction	4-way	3-way	2-way	4-way	3-way	2-way	4-way	3-way	2-way	4-way	3-way	2-way	Set data
Standard (at shipment)	2.7	—	3.0	2.8	3.2	3.5	3.0	3.3	3.6	3.6	3.9	4.2	0000
High ceiling (1)	Cannot be installed to a high ceiling			3.2	3.5	3.8	3.3	3.5	3.8	3.9	4.1	4.3	0001
High ceiling (2)				3.5	3.8	—	3.6	3.8	—	4.2	4.3	—	0003

External view

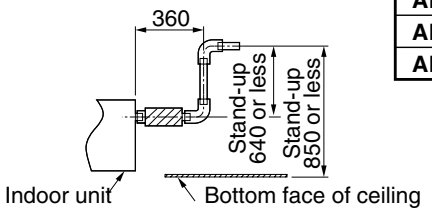


mm

Model	A	B	C	D
AP0091H to AP0121H	256	120	Ø6.4	Ø9.5
AP0151H to AP0181H				Ø12.7
AP0241H to AP0301H			Ø9.5	Ø15.9
AP0361H to AP0561H	319	183		

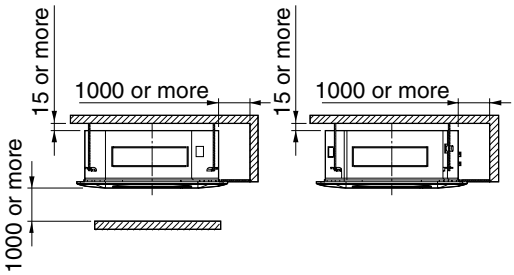


Z view



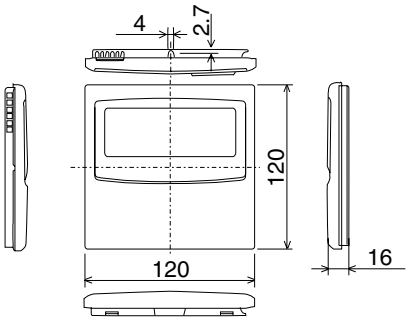
(NOTE)
As ABS is used for the drain discharge port of the main unit, the vinyl chloride paste cannot be used.
Use the flexible hose (Band fix) included in the package.

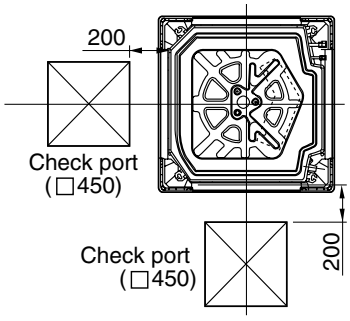
Drain-up standing-up size



Space required for installation and servicing

- **Wired remote controller (RBC-AMT21E)**





Ceiling opening and installation of hanging bolts

- Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.
- After installation place of the indoor unit has been determined, open the installation hole on the ceiling and install the hanging bolts.
- For the ceiling opening size and the hanging bolt pitch, refer to the external view and the attached installation pattern.
- If the ceiling has been already set up, draw the drain pipe, refrigerant pipe, indoor/outdoor inter-unit wire, wire for central control system, and remote controller wire up to the position where pipes and wires are to be connected before hanging the indoor unit.

Please procure the hanging bolts and nuts for installation of the indoor unit at local site.

Hanging bolt	M10 or W3/8	4 pieces
Nut	M10 or W3/8	12 pieces

[How to use the attached installation pattern]

The installation pattern is attached inside of the package cap.

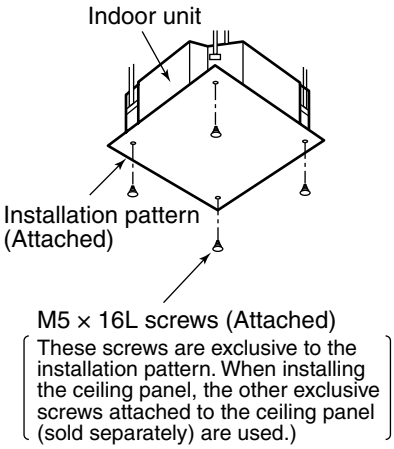
<In case of existing ceiling>

Use the pattern for positioning of the ceiling opening hole and the hanging bolt.

<In case of new ceiling>

Use the pattern for positioning of the opening hole when setting up a new ceiling.

- Install the indoor unit after installation of the hanging bolts.
- Using the attached pattern fixing screws (M5 × 16L: 4 pieces), attach the installation pattern to the indoor unit.
  (Screwing to installation brackets of the ceiling panel)
- When setting up the ceiling, open a hole along the outside dimension of the installation pattern.


Indoor unit
Installation pattern
(Attached)
M5 × 16L screws (Attached)
These screws are exclusive to the installation pattern. When installing the ceiling panel, the other exclusive screws attached to the ceiling panel (sold separately) are used.)

Opening a ceiling and installation of hanging bolts

[Treatment of ceiling]

The ceiling differs according to structure of building. For details, consult your constructor or interior finish contractor.

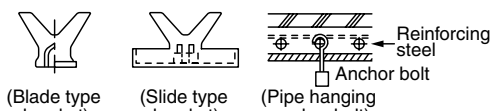
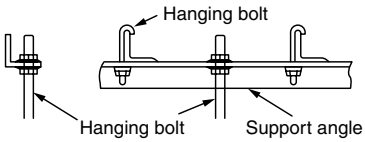
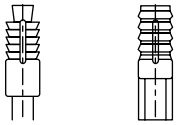
In the process after the ceiling board has been removed, it is important to reinforce ceiling foundation (frame) and to keep horizontal level of installed ceiling correctly in order to prevent vibration of ceiling board.

(1) Cut and remove the ceiling foundation.

(2) Reinforce the cut surface of ceiling foundation, and add ceiling foundation for fixing the end of ceiling board.

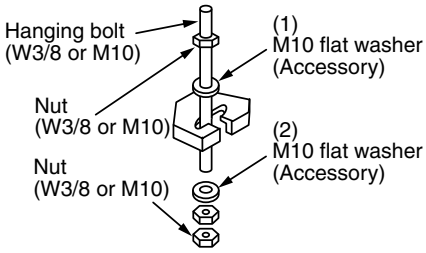
[Installation of hanging bolt]

Use M10 hanging bolts (4 pcs, to be local procure).
Matching to the existing structure, set pitch according to size in the unit external view as shown below.

New concrete slab	Steel flame structure	Existing concrete slab
Install the bolts with insert brackets or anchor bolts.	Use existing angles or install new support angles.	Use a hole-in anchors, hole-in plugs, or a hole-in bolts.
		

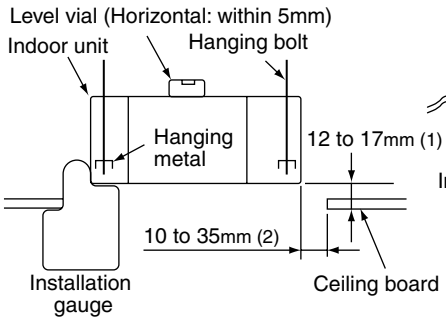
Installation of indoor unit

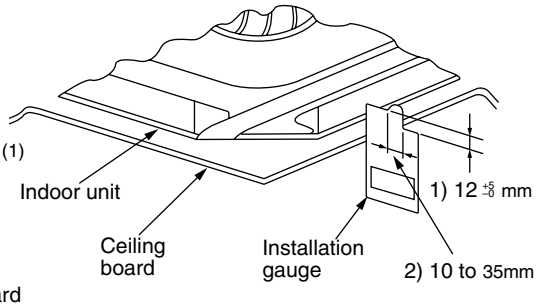
- Attach the nut (M10 or W3/8: Procured locally) and the attached washer (Ø34mm) to the hanging bolt.
- Put washers at up and down of T-groove of the hanging bracket of the indoor unit to hang the indoor unit.
- Using a level vial, check that four sides are horizontal. (Horizontal degree: Within 5mm)
- Cut off the attached installation gauge from the installation pattern.
- Using the installation gauge, check and adjust clearance between the indoor unit and the ceiling opening hole (1) (10 to 35mm common to four sides) and hanging-down height (2) (12 $^{+5}_{0}$mm: 4 corners). (Using direction is printed on the installation gauge.)

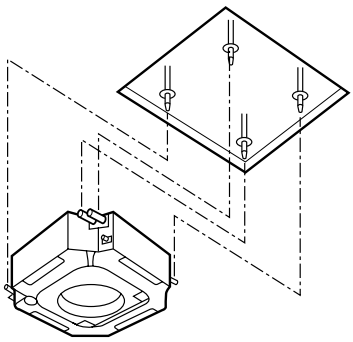


(1) Required those other than M10 flat washer at site.

(2) To prevent falling-off of bolt (safety), be sure to set it just under the hanging bracket as shown in the figure.

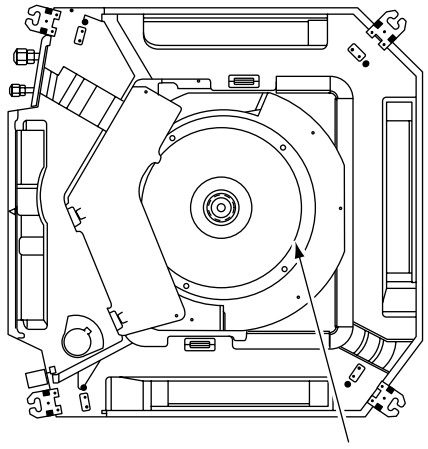






REQUIREMENT

Before installation of the indoor unit, be sure to remove the cushion for transportation between the fan and the bell mouth. Running the unit without removing the cushion may damage the fan motor.



Be sure to remove the cushion for transportation between the fan and the bell mouth.

REQUIREMENT

Connect closely the connecting parts between the ceiling panel and the ceiling surface or between the ceiling panel and the indoor unit.

If they are incompletely connected, air leaks resulted in dewing or water leakage.

First, remove the adjust corner caps (4 corners) from the ceiling panel and then install the ceiling panel to the indoor unit.

Installation of ceiling panel (Sold separately)

Install the ceiling panel after piping/wiring work has finished.

Install the ceiling panel according to attached Installation Manual.

Check the installation dimensions of the indoor unit and the ceiling opening are correct, and then install it.

Installation of remote controller (Sold separately)

For installation of the wired remote controller, follow the Installation Manual attached with the remote controller.

For installation of the wireless remote controller, follow to the Installation Manual attached to the remote controller.

- Do not put the remote controller on the place where is exposed to direct sunlight or near a stove, etc.
- Operate the remote controller, check the indoor unit surely receives the signal, and then install the remote controller. (Wireless type)
- Install the remote controller 1m apart from the devices such as TV or stereo. (Image may be disturbed or noise may be output.) (Wireless type)

6-4. 2-Way Air Discharge Cassette Type

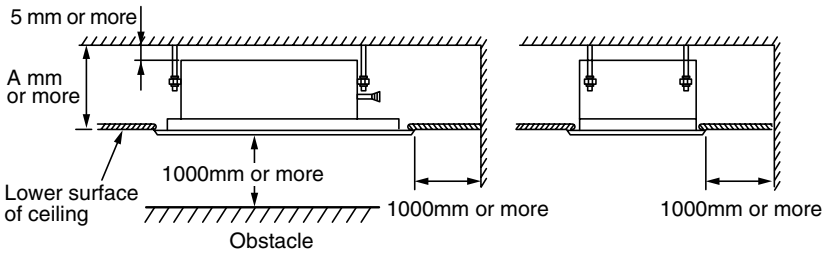
Installation space

Reserve space required to install the indoor unit and for service work.

Keep 5mm or more for clearance between top plate of the indoor unit and the ceiling surface.

<Installation space>

Model MMU-	Ceiling depth A mm
AP0071WH type to AP0301WH type	398 or more
AP0481WH type	406 or more



Ceiling height

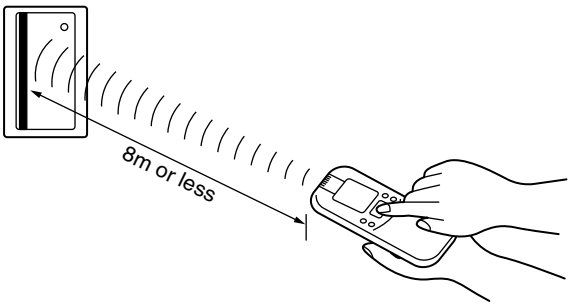
Model MMU-	Installable ceiling height
AP0071WH to AP0121WH type	Up to 2.7m
AP0151WH to AP0301WH type	Up to 3.0m
AP0481WH type	Up to 3.5m

When the ceiling height exceeds 2.7m, the hot air is difficult to reach the floor. In this case, it is necessary to exchange number of rotation of the fan motor by using connector for increase of number of motor rotation which is attached to the air conditioner body.

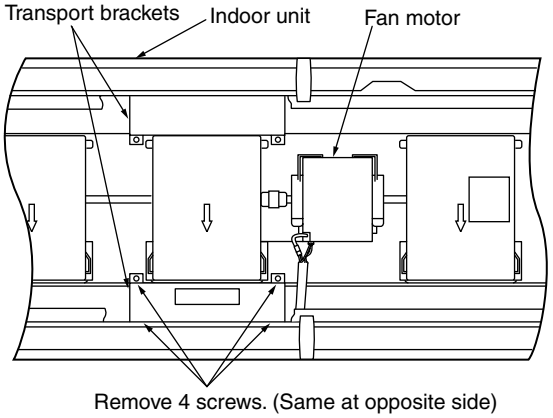
In case of wireless type

The sensor of indoor unit with wireless remote controller can receive a signal 8m or less. Based upon it, determine a place where the remote controller is operated and the installation place of the indoor unit.

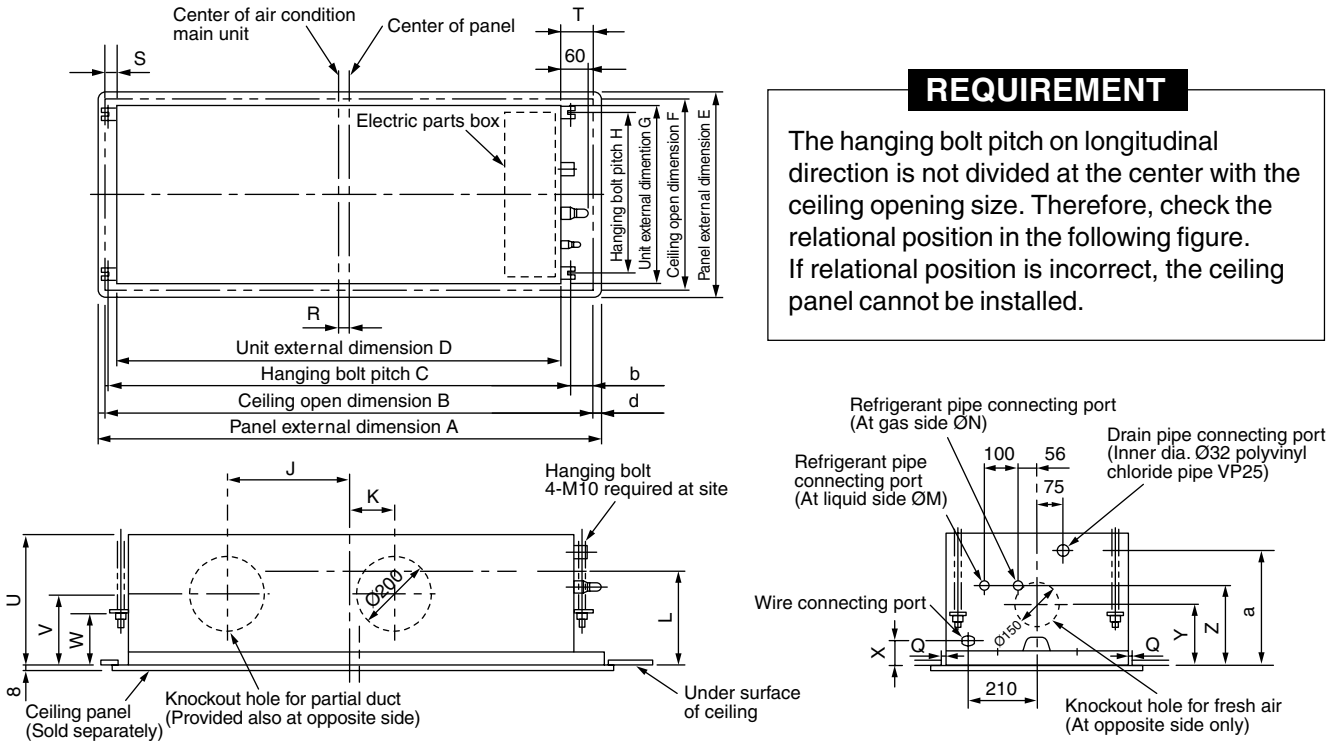
- To prevent a malfunction, select a place where is not influenced by a florescent light or direct sunlight.
- Two or more (Up to 6 units) indoor units with wireless remote controller can be installed in the same room.



- **Removal of transport brackets (MMU-AP0151WH type to MMU-AP0301WH type)**
  - Remove the transport brackets before installation of the indoor unit.
  - The transport brackets cannot be removed under condition of ceiling panel installed.



- **External view**



REQUIREMENT

The hanging bolt pitch on longitudinal direction is not divided at the center with the ceiling opening size. Therefore, check the relational position in the following figure.
If relational position is incorrect, the ceiling panel cannot be installed.

Model MMU-	A	B	C	D	E	F	G	H	J	K	L	M	N
AP0071WH to AP0121WH type	1000	960	880	830	650	620	550	480	265	—	255	Ø6.4	Ø9.5
AP0151WH to AP0181WH type	1520	1480	1400	1350					295		280		Ø12.7
AP0241WH to AP0301WH type												Ø9.5	Ø15.9
AP0481WH type	1898	1850	1700	1650	680	650	620	510	455	150	288		

Model MMU-	Q	R	S	T	U	V	W	X	Y	Z	a	b	d
AP0071WH to AP0121WH type	35	30	35	95	398	222	156	78	178	242	348	70	20
AP0151WH to AP0181WH type													
AP0241WH to AP0301WH type													
AP0481WH type	15	5	95	105	406	230	166	86	186	250	356	80	24

Ceiling opening and installation of hanging bolts

- Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.
- After installation place of the indoor unit has been determined, open the installation hole on the ceiling and install the hanging bolts.
- For the ceiling opening size and the hanging bolt pitch, refer to the external view and the attached installation pattern.
- If the ceiling has been already set up, draw the drain pipe, refrigerant pipe, indoor/outdoor inter-unit wire, wire for central control system, and remote controller wire up to the position where pipes and wires are to be connected before hanging the indoor unit.

Please procure the hanging bolts, washer and nuts for installation of the indoor unit at local site.

Hanging bolt	M10 or W3/8	4 pcs.
Nut	M10 or W3/8	12 pcs.
Flat washer	M10	8 pcs.

[How to use the attached installation pattern]

The installation pattern is attached inside of the package cap.

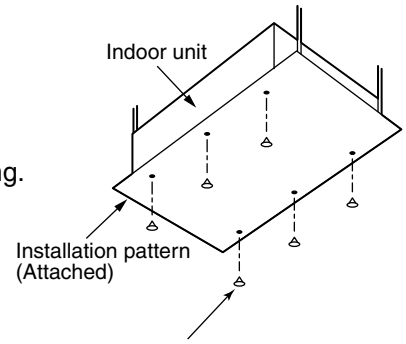
<In case of existing ceiling>

Use the pattern for positioning of the ceiling opening hole and the hanging bolt.

<In case of new ceiling>

Use the pattern for positioning of the opening hole when setting up a new ceiling.

- Install the indoor unit after installation of the hanging bolts.
- Using the attached pattern fixing screws (M5 × 16L: 6 pcs.), attach the installation pattern to the indoor unit. (Screwing to installation brackets of the ceiling panel)
- When setting up the ceiling, open a hole along the outside dimension of the installation pattern.



M5 × 16L screws (Attached)

These screws are exclusive to the installation pattern. When installing the ceiling panel, the other exclusive screws attached to the ceiling panel (sold separately) are used.)

Installation of ceiling panel (Sold separately)

Install the ceiling panel after piping/wiring work has finished.
Install the ceiling panel according to attached Installation Manual.
Check the installation dimensions of the indoor unit and the ceiling opening are correct, and then install it.

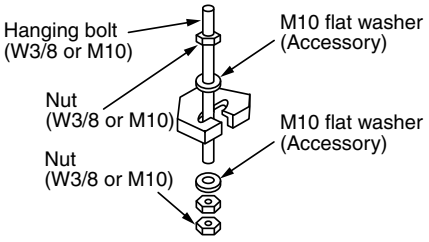
REQUIREMENT

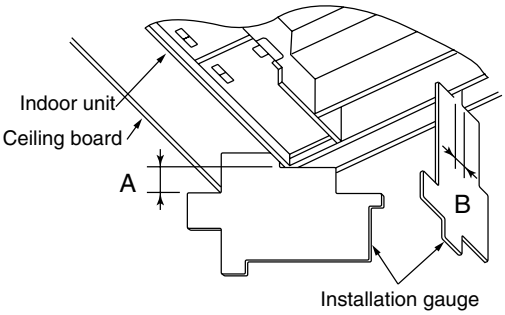
Connect closely the connecting parts between the ceiling panel and the ceiling surface or between the ceiling panel and the indoor unit.

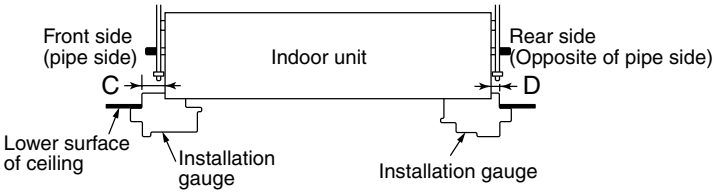
If they are incompletely connected, air leaks resulted in dewing or water leakage.

Installation of indoor unit

- Attach the nut (M10 or W3/8: Procured locally) and the plain washer (M10: Procured locally) to the hanging bolt.
- Put washers at up and down of U-groove of the hanging bracket of the indoor unit to hang the indoor unit.
- Using a level vial, check that four sides are horizontal. (Horizontal degree: Within 5mm)
- Cut off the attached installation gauge from the installation pattern.
- Using the installation gauge, check and adjust clearance between the indoor unit and the ceiling opening hole, and the check and adjust the hanging-down height of the unit. (Using direction is printed on the installation gauge.)
  1) Check distance between the bottom surface of the indoor unit and the bottom surface of the ceiling board is wider than size A. (4 corners)
  2) Check the clearance between the side surface of the indoor unit (longitudinal side) and the ceiling board is same to size B. (Common to right and left)
  3) Check the clearance between front surface (Piping side) of the indoor unit and the ceiling board is size C, and then check also the clearance between the rear surface (Piping opposite side) of the indoor unit and the ceiling board is size D.



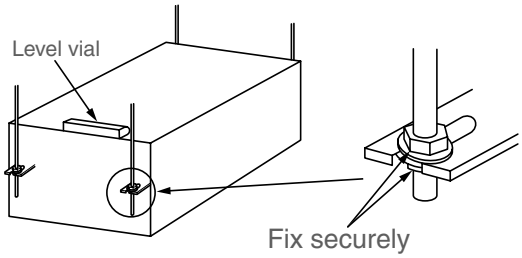




Model MMU-	A	B	C	D
AP0071WH to AP0301WH type	53	35	95	35
AP0481WH type	68	15	105	95

REQUIREMENT

- Using a level vial, etc., confirm the horizontal level of the indoor unit.
- Tighten the nut sufficiently, and fix it securely.



Installation of ceiling panel (Sold separately)

Install the ceiling panel according to Installation Manual attached with it after piping/wiring work has completed.
Check that installation of indoor unit and ceiling opening part is correct, and then install it.

REQUIREMENT

Connect closely the connecting sections of ceiling panel and ceiling surface, and the ceiling panel and indoor unit.

If there is clearance, air leakage generates resulting in dewing or water leakage.

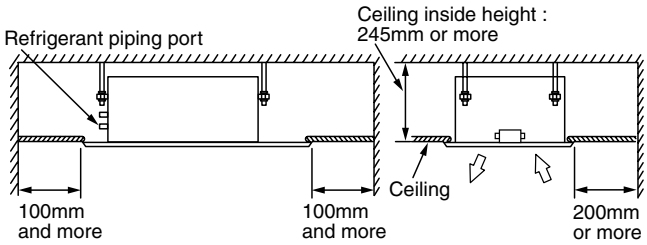
6-5. 1-Way Air Discharge Cassette Type

Installation space

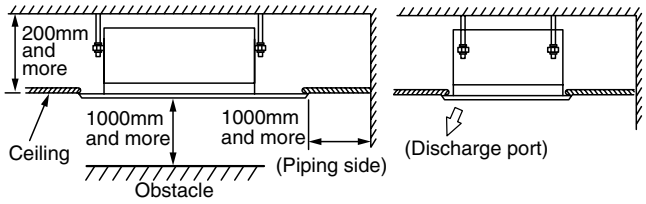
Secure the space required to installation and servicing.

Keep 5mm or more for clearance between top plate of the indoor unit and the ceiling surface.

<MMU-AP0071YH to AP0121YH>



<MMU-AP0151SH to AP0241SH>



Height of ceiling

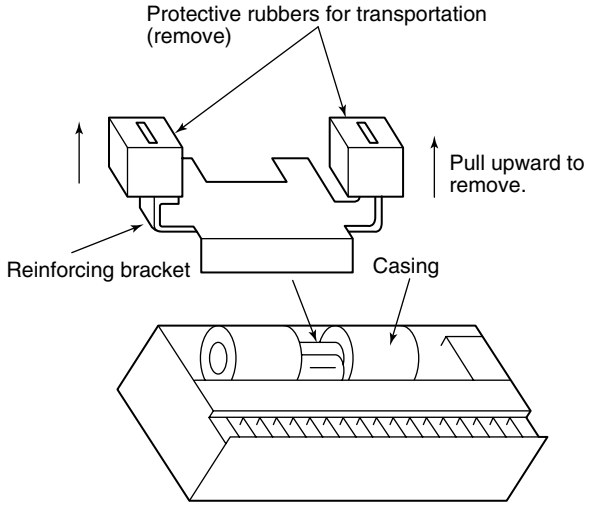
When height of the ceiling exceeds 3.0m, it is difficult that the hot air reaches up to the floor surface. In this case, it is necessary to exchange the motor speed-up by using a connector, which is attached to the air conditioner unit.

Installable height of ceiling
Up to 3.0m

Removal of transporting rubbers

<MMU-AP0071YH to AP0121YH>

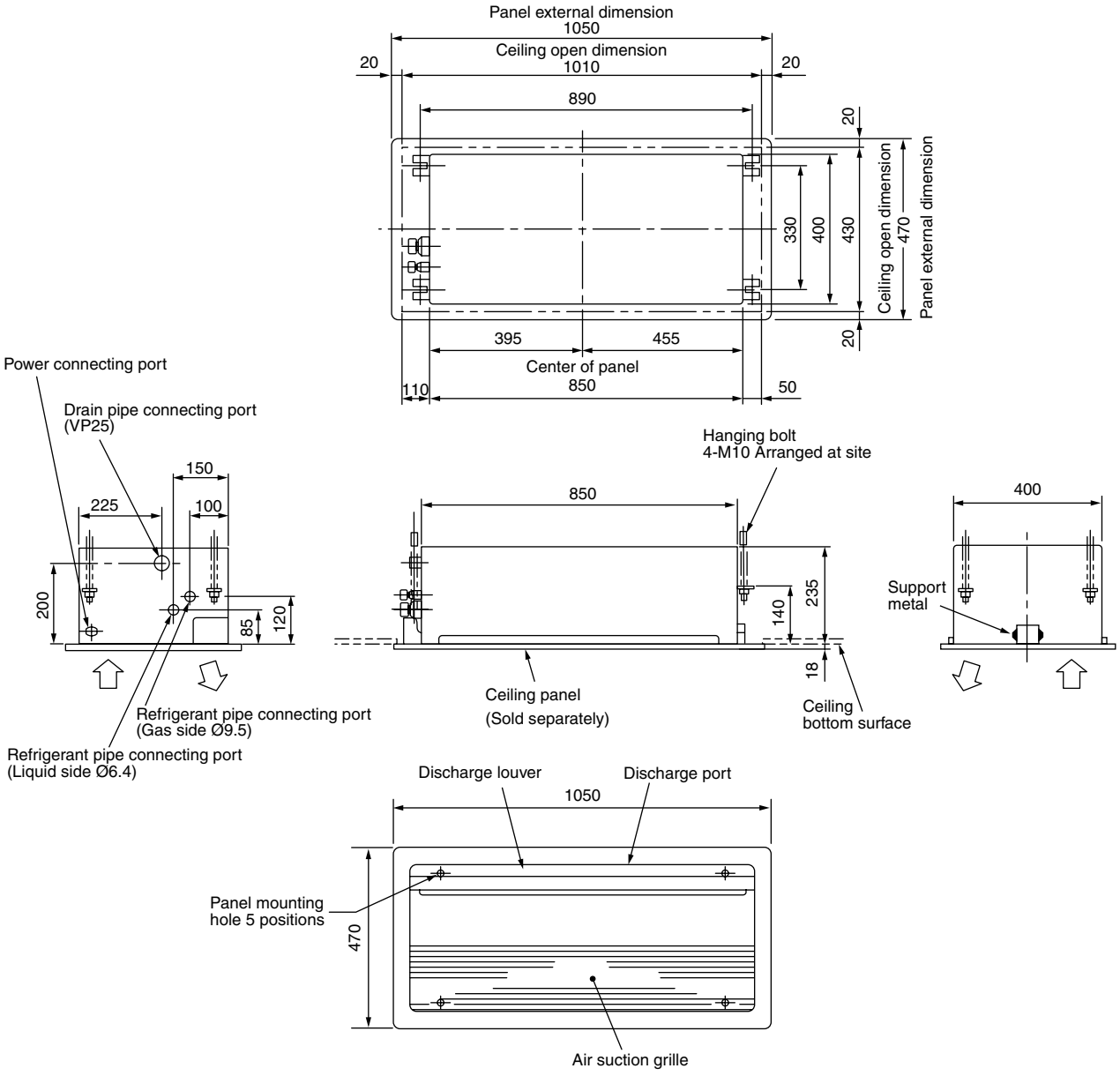
- Before installation of the indoor unit, remove the two protective rubbers for transportation which are inserted between the reinforcing bracket for the fan motor and the casing.
  (Hand over the protective rubbers for transportation to the customers and ask to keep them because they are used for transportation such as reinstallation.)



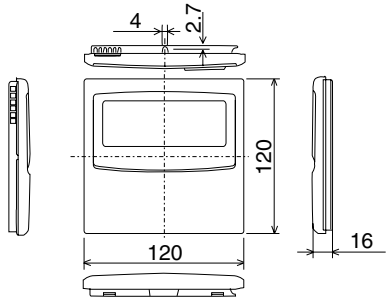
Considering cabling and cable connecting works in the ceiling after hanging the indoor unit, select an installation place and determine drawing direction of the cables.

- In a case that the ceiling has been already existed, draw refrigerant cable, drain cable, indoor connecting cable and remote controller cord up to the position where pipes and cables are to be connected in advance when hanging the indoor unit.
- Check dimension of the indoor unit, determine size of the indoor unit itself and the ceiling opening and perform positioning, using the attached installation pattern.
  (The pattern is attached to bottom surface with five M5 x 20 screws.)

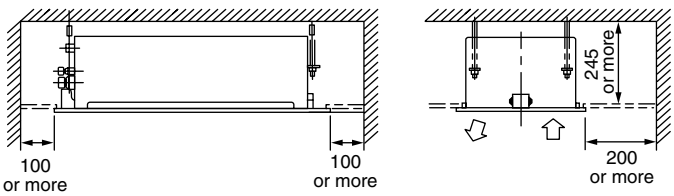
External view <MMU-AP0071YH to AP0121YH>



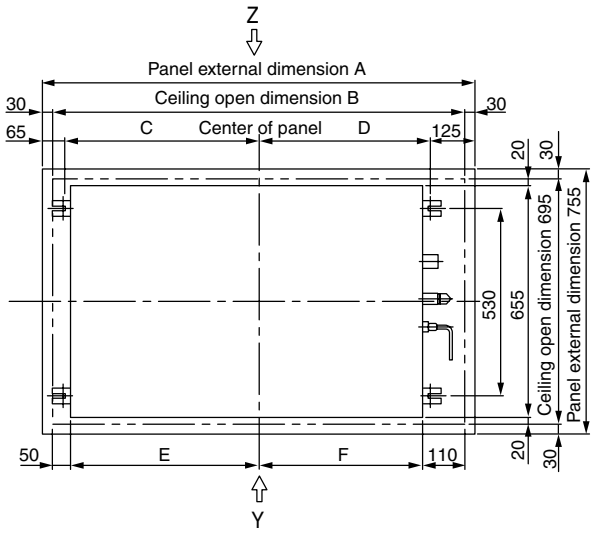
- **Wired remote controller (RBC-AMT21E)**

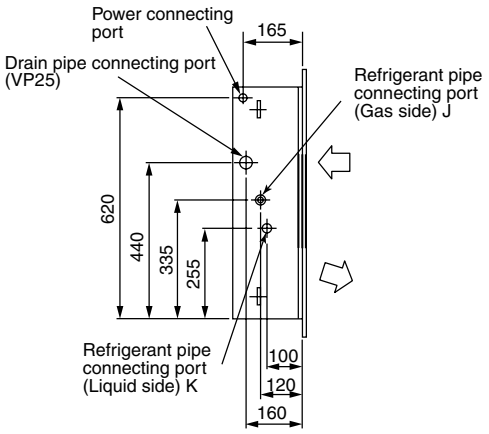


Space necessary for installation and servicing

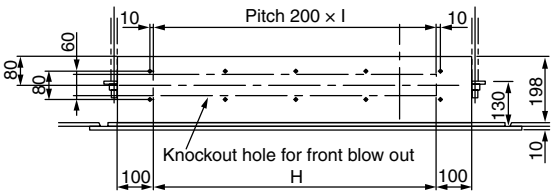


External view <MMU-AP0151SH to AP0241SH>

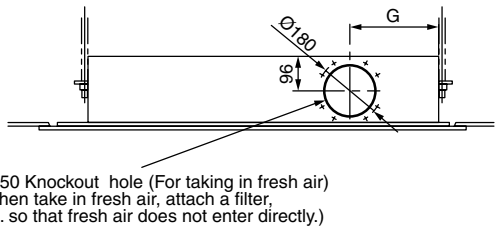


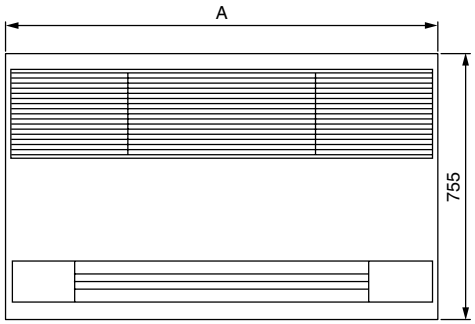


Y view



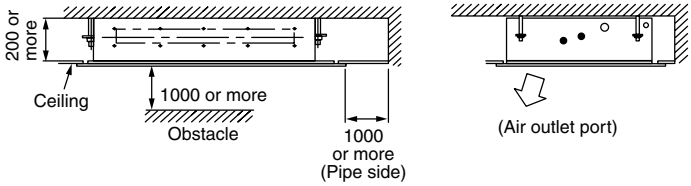
Z view


Ø180
G
96
Ø150 Knockout hole (For taking in fresh air)
(When take in fresh air, attach a filter,
etc. so that fresh air does not enter directly.)

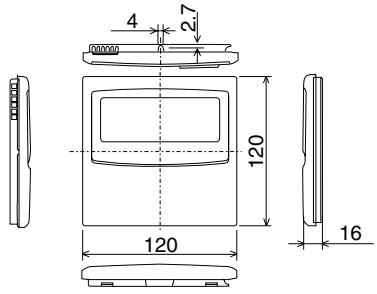


Note
When using the discharge divided duct and the duct to take in fresh air, consult your dealer about availability.

Space necessary for installation and servicing



- **Wired remote controller (RBC-AMT21E)**



Model	A	B	C	D	E	F	G	H	I	J	K
AP0151, AP0181	1220	1160	545	485	530	470	254	800	4	Ø12.9	Ø6.4
AP0241	1420	1360	645	585	630	570	460	1000	5	Ø15.9	Ø9.5

Ceiling opening and installation of hanging bolts

- Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.
- After installation place of the indoor unit has been determined, open the installation hole on the ceiling and install the hanging bolts.
- For the ceiling opening size and the hanging bolt pitch, refer to the external view and the attached installation pattern.
- If the ceiling has been already set up, draw the drain pipe, refrigerant pipe, indoor/outdoor inter-unit cable, cable for central control system, and remote controller cable up to the position where pipes and cables are to be connected before hanging the indoor unit.

Please procure the hanging bolts and nuts for installation of the indoor unit at local site.

Hanging bolt	M10 or W3/8	4 pieces
Nut	M10 or W3/8	12 pieces
Flat washer	M10	8 pieces

[How to use the attached installation pattern]

The installation pattern is attached inside of the package cap.

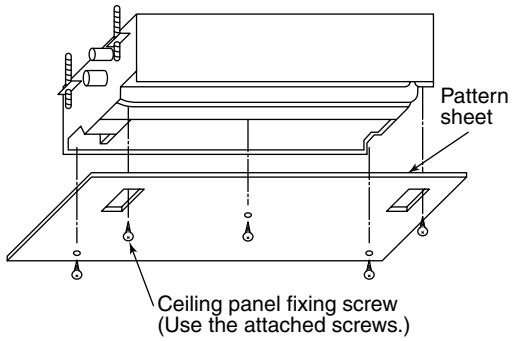
<In case of existing ceiling>

Use the installation pattern for positioning of the ceiling opening hole and the hanging bolt.

<In case of new ceiling>

Use the installation pattern for positioning of the opening hole when setting up a new ceiling.

- Install the indoor unit after installation of the hanging bolts.
- Using the attached installation pattern fixing screws (M5 × 20L: 4 pieces), attach the installation pattern to the indoor unit.
  (Screwing to installation brackets of the ceiling panel)
- When setting up the ceiling, open a hole along the outside dimension of the installation pattern.

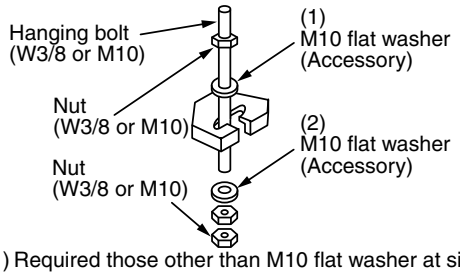


Installation of indoor unit

⚠ CAUTION

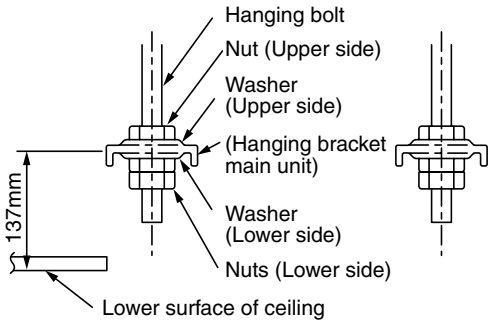
This unit is incorporated with drain pump and float switch. Never incline the main unit. Otherwise, malfunction of the float switch may be caused resulting in water leakage.

- Attach the nut (M10 or W3/8: Procured locally) and the attached washer (Ø34mm) to the hanging bolt.
- Adjust nut position (lower side) so that clearance between (lower side) and the lower side of ceiling board is 137mm.
- Hang up the main unit by hanging nut of hanging bolt to T groove of hanging bracket of the indoor unit.
- Using the level vial, etc., check the horizontal level of the indoor unit.
- Using the installation pattern, check and adjust the positional relation between the indoor unit and ceiling opening hole, and hanging-up height of the indoor unit.

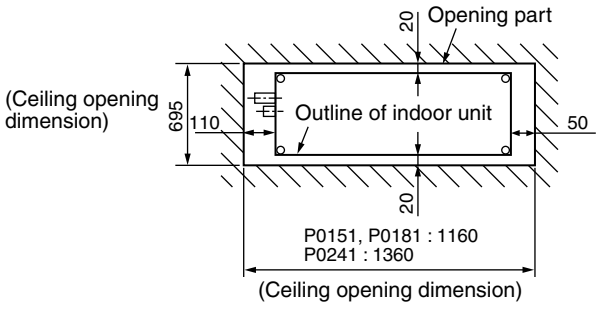


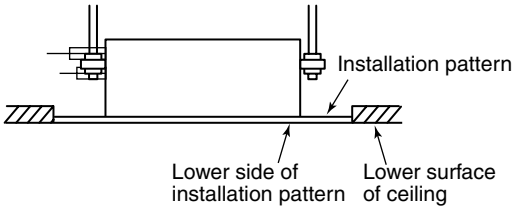
(1) Required those other than M10 flat washer at site.

(2) To prevent falling-off of bolt (safety), be sure to set it just under the hanging bracket as shown in the figure.



- The used screws when attaching the installation pattern are used again to install the panel.
- Using the ceiling panel fixing screws, fix the installation pattern under surface of the indoor unit.
- Fit the ceiling opening size to outside of the installation pattern.



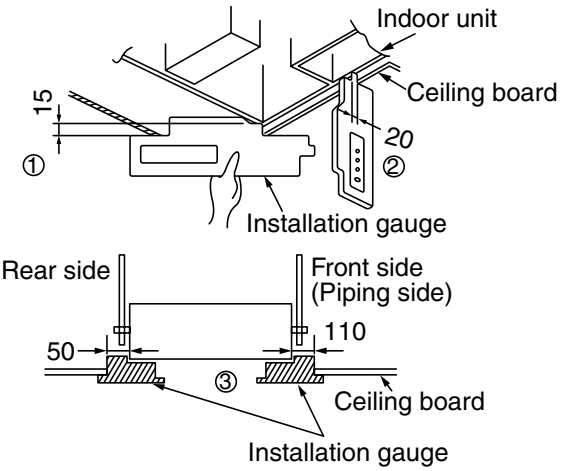


<MMU-AP0151SH to AP0241SH>

① Check lower side of the indoor unit locates at position 15mm higher than bottom surface of the ceiling board. (4 corners)

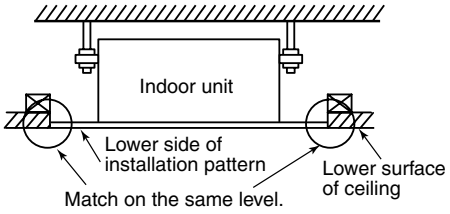
② Check clearance between the side of the indoor unit and the ceiling board is 20mm. (Both left/right)

③ Check clearance between the front side (piping side) of the indoor unit and the ceiling board is 110mm, and clearance between rear side of indoor unit and the ceiling board is 50mm.

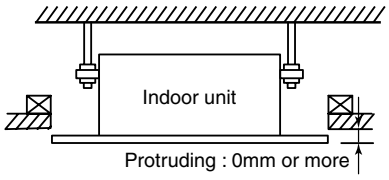


- Match the bottom surface of ceiling and lower side of installation pattern on the same level.

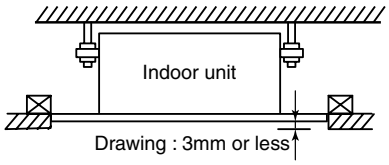
GOOD



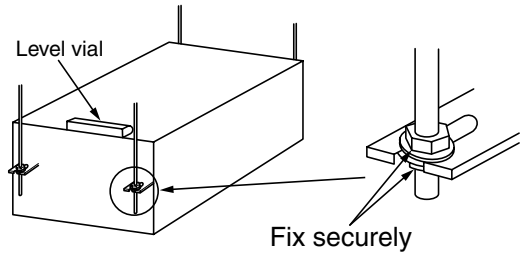
NOT GOOD



NOT GOOD



- Fix the indoor unit securely by tightening nut at upper side.



REQUIREMENT

- Using a level vial, etc., confirm the horizontal level of the indoor unit.
- Tighten the nut sufficiently, and fix it securely.

Installation of ceiling panel (Sold separately)

Install the ceiling panel according to Installation Manual after piping/wiring work has completed.

Check that installation of indoor unit and ceiling opening part is correct, and then install it.

REQUIREMENT

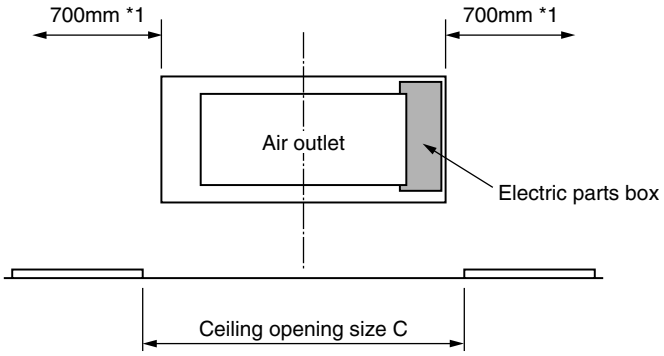
Connect the connecting sections of ceiling panel and ceiling surface, and the ceiling panel and indoor unit closely.

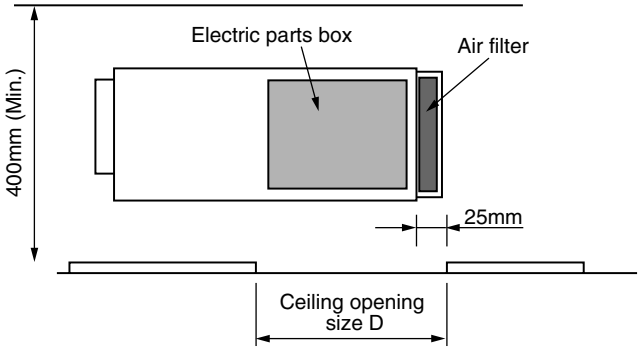
If there is clearance, air leakage generates resulting in dewing or water leakage.

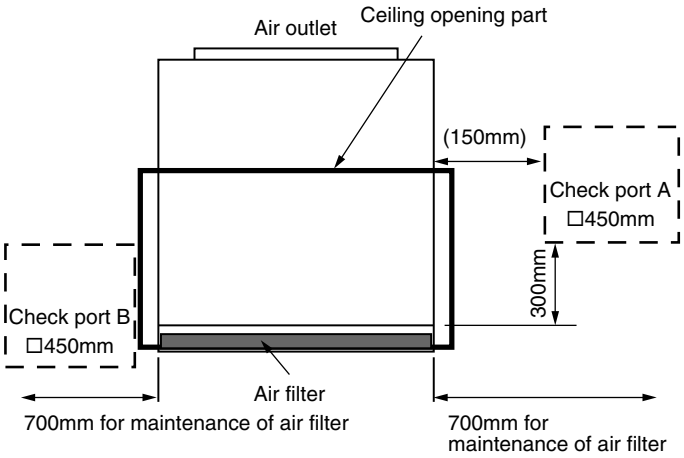
6-6. Concealed Duct Type

Installation space

Reserve space required for maintenance the indoor unit and service work.







Notes)

*1 Be sure that space with 700mm or more is reserved for attachment/detachment at the taking-out direction of the air filter.

*2 Be sure to set a check port (A) for the refrigerant piping, drain piping, maintenance of drain pan, etc; otherwise maintenance for devices is unavailable.

*3 If the taking-out direction of the air filter is set at the left side, be sure to set a check port (B) at the left side of the set for attachment/detachment of the air filter. If there is no check port (B), the air filter cannot be attached or detached.

*4 Be sure to set a ceiling opening for maintenance of the electric ports such as fan motor; otherwise maintenance for electric parts such as fan motor is unavailable.

Unit: [mm]

MODEL MMD-AP	0071BH to 0121BH	0151BH to 0181BH	0241BH to 0301BH	0361BH to 0561BH
Set width (mm)	550	700	1000	1350
Air filter width (mm)	508	655	960 (480*2)	1310 (655*2)
Ceiling opening size C	600	750	1050	1400
Ceiling opening size D	470	470	470	470

Installation under high-humidity atmosphere

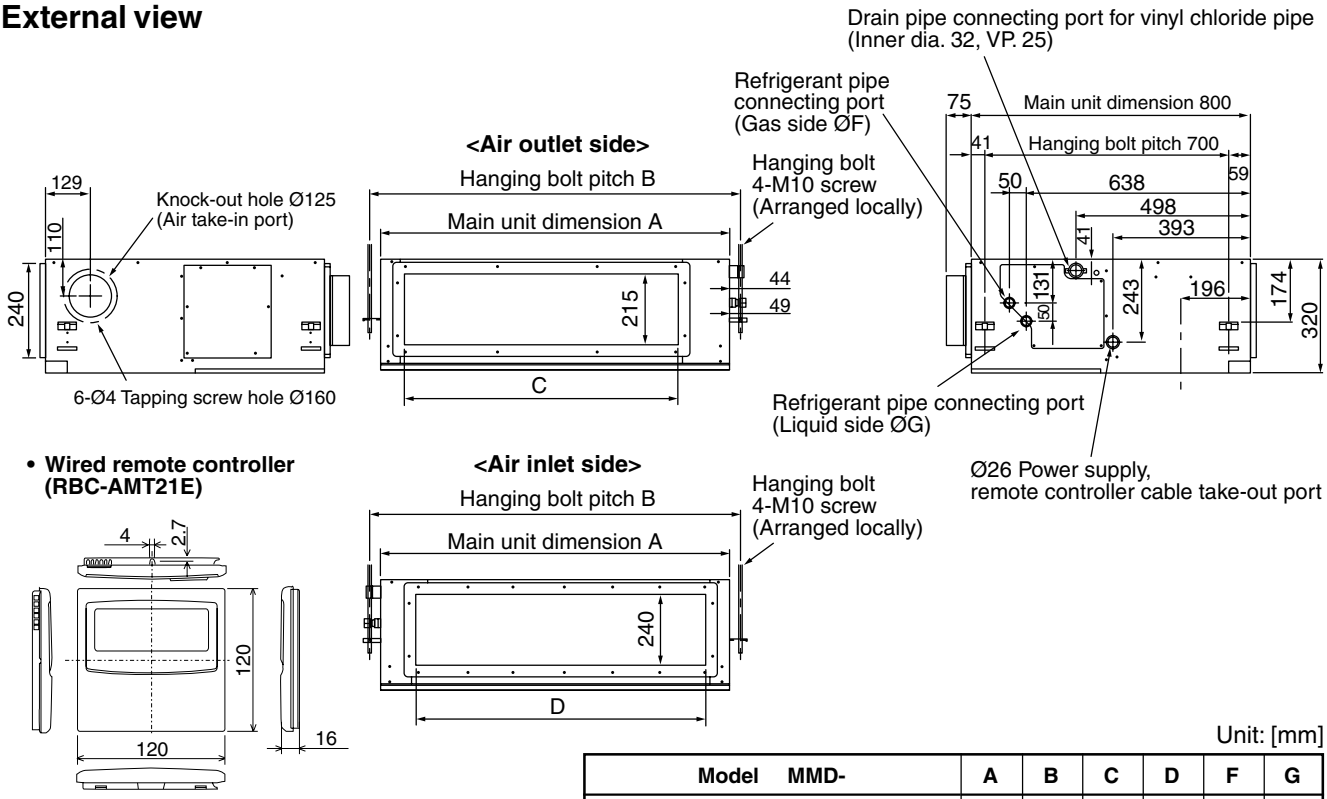
In some cases including the rainy season, especially inside of the ceiling may become high-humidity atmosphere (dew-point temperature: 23°C or higher).

1. Installation to inside of the ceiling with tiles on the roof
2. Installation to inside of the ceiling with slated roof
3. Installation to a place where inside of the ceiling is used for pathway to intake the outside air

- In the above cases, additionally attach the thermal insulator (Glass wool, etc.) to all positions of the air conditioner, which come to contact with the high-humidity atmosphere. In this case, arrange the side plate (Service plate) so that it is easily removed.
- Apply also a sufficient thermal insulation to the duct and connecting part of the duct.

[Reference] Dewing test conditions
Indoor side: 27°C dry bulb temperature
24°C wet bulb temperature
Air volume: Low air volume, operation time 4 hours

External view



Unit: [mm]

Model MMD-	A	B	C	D	F	G
AP0071BH, AP0091BH, AP0121BH	550	616	350	470	9.5	6.4
AP0151BH, AP0181BH	700	766	500	620	12.7	6.4
AP0241BH, AP0271BH, AP0301BH	1000	1066	800	920	15.9	9.5
AP0361BH, AP0481BH, AP0561BH	1350	1416	1150	1270	15.9	9.5

Opening hole on ceiling and placing of hanging bolt

- Considering the indoor unit and the hanged-up piping/wiring work, determine the installation position and direction.
- After installation position of the indoor unit has been determined, open a hole on the wiring and place the hanging bolt.
- For opening size of the ceiling and the hanging bolt pitch, see the external view.
- When the ceiling has already boarded, draw the drain pipe, refrigerant pipe, inter-unit wire between indoor and outdoor units, central control system wire, and remote controller wire up to the position where pipes and wires are connected before hanged-up the indoor unit.

The hanging bolts and nuts will be procured locally.

Hanging bolt	M10 or W3/8	4 pieces
Nut	M10 or W3/8	12 pieces

Setup of outside static pressure

Be sure to set up a tap change based upon the resistance (External static pressure) of the duct to be connected.

To change the external static pressure, setup the item code (DN) from wired remote controller is necessary. (Item code = [5d])

For details of procedure, refer to the section of "**13-1**".

<Change on wired remote controller>

Setup data	Outside static pressure	
0000	40Pa	Standard (At shipment)
0001	70Pa *1	High static pressure 1
0003	100Pa *2	High static pressure 2
0006	20Pa	High static pressure

*1: 65Pa for Model AP0481BH, AP0561BH
*2: 90Pa for Model AP0481BH, AP0561BH

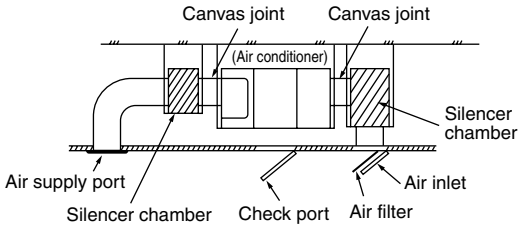
6-7. Concealed Duct High Static Pressure Type

Duct design

1. In order to prevent short circuits, design the duct work so that the intake and discharge openings are not adjacent to each other.
2. The indoor unit does not have a built-in air filter. Always install the air filter (Local procure) in a location that permits easy maintenance, such as behind the intake grille. (If no air filter is installed, dust will collect in the heat exchanger, which may cause the air conditioner to fail or to leak.)

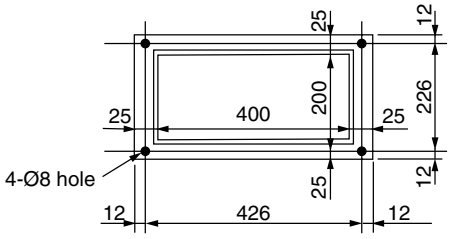
<Overview of duct connection>

NOTE : Parts except air conditioner unit are to be locally procured.

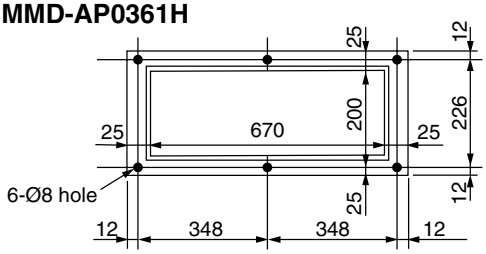


<Air supply connecting flange>

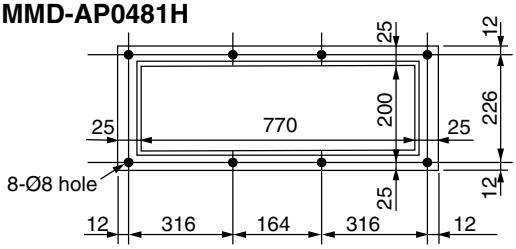
MMD-AP0181H to AP0271H



MMD-AP0361H

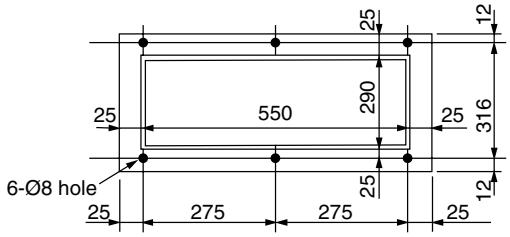


MMD-AP0481H

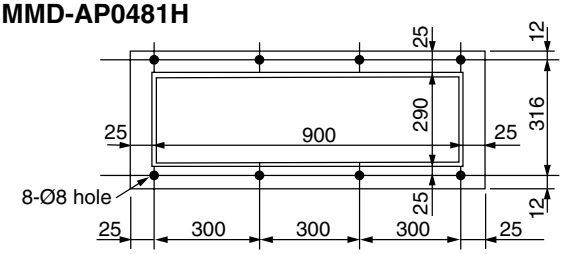


<Air return connecting flange>

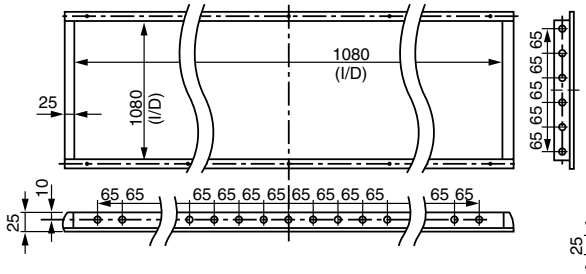
MMD-AP0181H to AP0361H



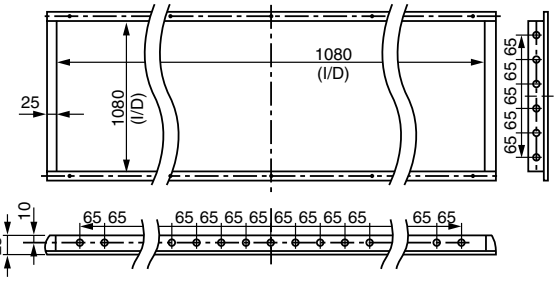
MMD-AP0481H



MMU-AP0721H to AP0961H



<Air supply side connecting flange>



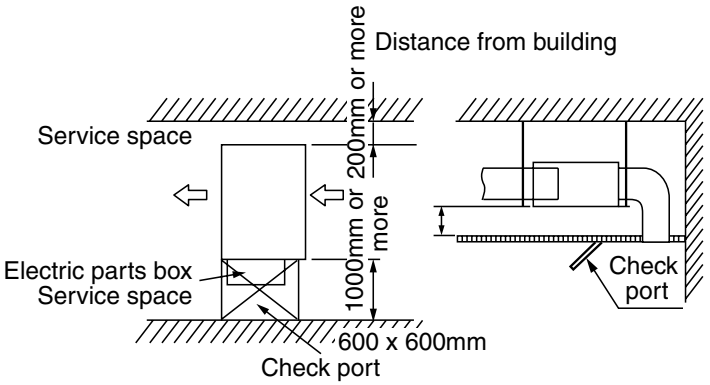
<Return air side connecting flange>

REQUIREMENT

If the air conditioner unit and the canvas joint are connected with the rivets, the fan and the refrigerating cycle become unavailable to be checked. Be sure to use the bolts for tightening the flange.
(Fixing bolts M6 × 12 Field-supplied)

Service space

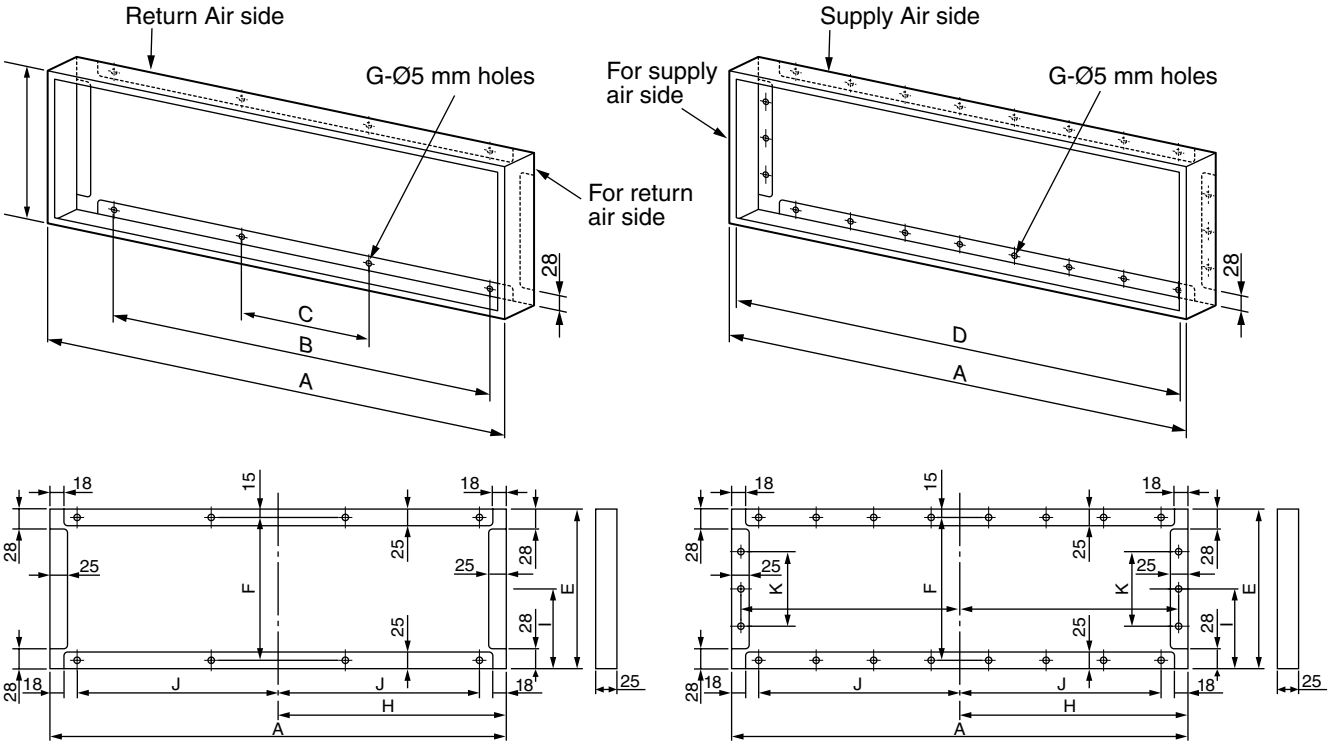
MMU-AP0721H to AP0961H



For reference

<Square duct> (Procured locally)

MMD-0071BH to 0561BH



Unit: [mm]

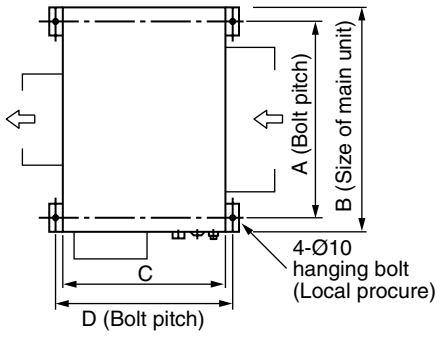
	Model MMD-	A	B	C	D	E	F	G	H	I	J	K
Return Air side (Return filter side)	AP0071BH to AP0121BH											
	AP0151BH to AP0181BH	700	—	400	—	420	390	4	350	195	—	—
	AP0241BH to AP0301BH	1000	700	430	—	420	390	8	500	195	350	—
	AP0361BH to AP0561BH	1350	1050	580	—	420	390	8	675	195	525	—
Supply Air side	AP0071BH to AP0121BH											
	AP0151BH to AP0181BH	550	455 (65 x 7)	65	530	265	245	20	275	132.5	227.5	130
	AP0241BH to AP0301BH	850	715 (65 x 11)	65	830	265	245	28	425	132.5	307.5	130
	AP0361BH to AP0561BH	1200	1105 (65 x 17)	65	1180	265	245	40	600	132.5	552.5	130

External view

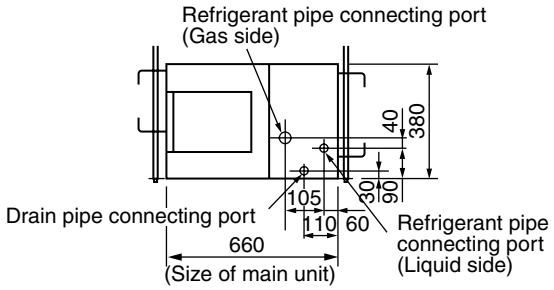
Installing the four 10mm-diameter hanging bolts

- Space the hanging bolts according to the dimensions shown in the diagrams below.
- Use 10mm-diameter hanging bolts (Required at the site).

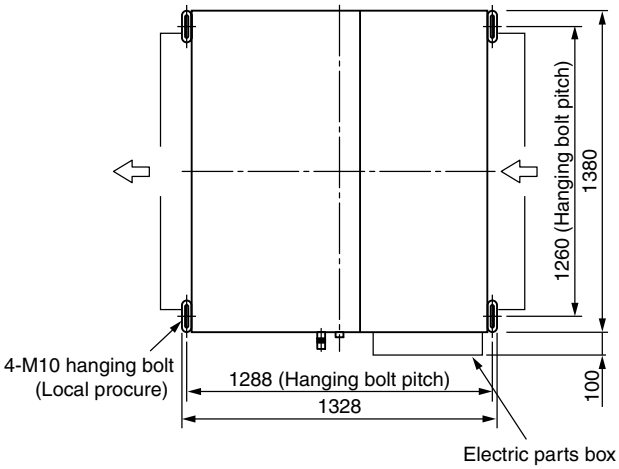
MMD-AP0181H to AP0481H

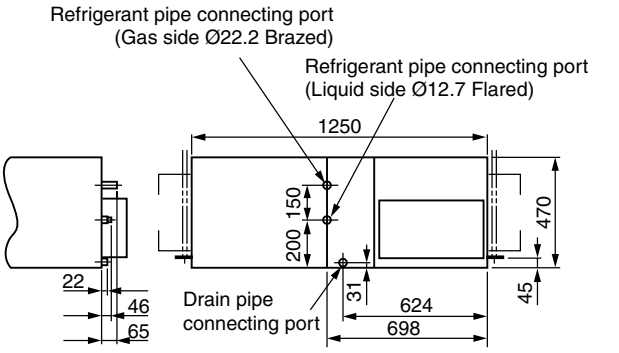


Model MMD-	A	B	C	D
AP0181H to AP0361H	800mm	850mm	660mm	700mm
AP0481H	1060mm	1200mm	1288mm	1328mm



MMD-AP0721H to AP0961H





<Treatment of ceiling>

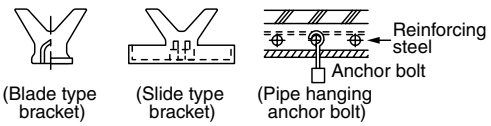
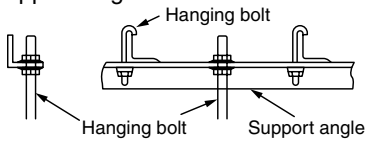
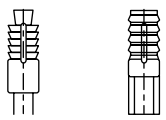
A ceiling is treated differently according to the structure of the building. For details, contact the constructor or the interior finish worker.

For treatment of the ceiling board after removal, it is important to reinforce the ceiling (Framework) so as to prevent the ceiling board from vibration and to keep the level of the existing ceiling correctly.

Installation of hanging bolt

Use M10 hanging bolts (4 pcs, to be local procure).

Matching to the existing structure, set pitch according to size in the unit external view as shown below.

New concrete slab	Steel flame structure	Existing concrete slab
Install the bolts with insert brackets or anchor bolts.  	Use existing angles or install new support angles.  	Use a hole-in anchors, hole-in plugs, or a hole-in bolts. 

Installation of remote controller (Sold separately)

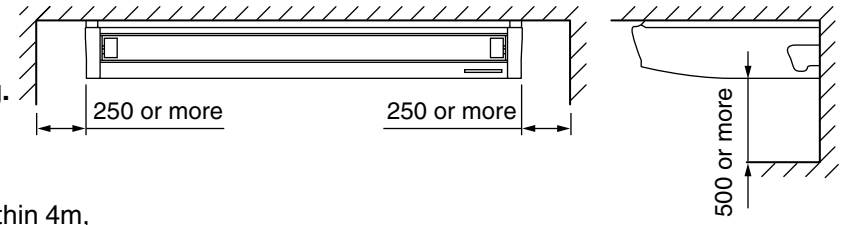
For installation of the remote controller, follow to the Installation Manual attached to the remote controller.

- Do not put the remote controller on the place where is exposed to direct sunlight or near a stove, etc.

6-8. Under Ceiling Type

Installation space

Secure the specified space in the figure for installation and servicing.



Height of ceiling

Set the installable height of the ceiling within 4m, otherwise the air distribution will become poor.

If height of ceiling exceeds 3.5m, hot air becomes difficult to reach the floor surface, and then the change of setup of high ceiling is necessary.

When incorporating a filter sold separately, the change of setup of high ceiling is also necessary.

For the change method of high ceiling, refer to the application control, “In case of installation to high ceiling” and “In case of incorporating filter sold separately” in this Manual.

List of installable ceiling height

Setup data		
0000	Standard (At shipment)	3.5m or less
0001	High ceiling 1	4.0m or less

According to the conditions of installation, setup time of turning-on of filter sign (notification of filter cleaning) of the remote controller can be changed.

When it is difficult to warm up the room due to installation place or structure of the room, the detection temperature of heating can be raised.

For change the setup time, refer to the application control, “Change of filter sign turning-on time” and “How to increase the heating effect” in this Manual.

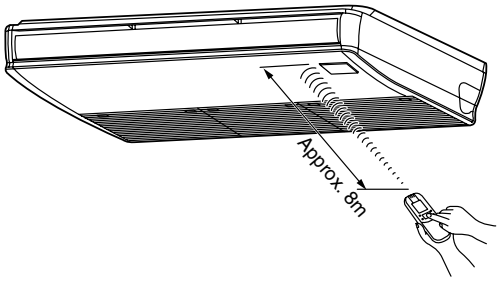
In case of wireless type

Decide the position which remote controller is operated and the installation place.

And then refer to the Installation Manual of the wireless remote controller kit sold separately.

(The signal of the wireless type remote controller can be received within approx. 8m. This distance is a criterion and varies a little according to capacity of the battery, etc.)

- To prevent malfunction, select a place where is not affected by a fluorescent lamp or direct sunlight.
- Two or more (up to 6 units) wireless-type indoor units can be set in a room.

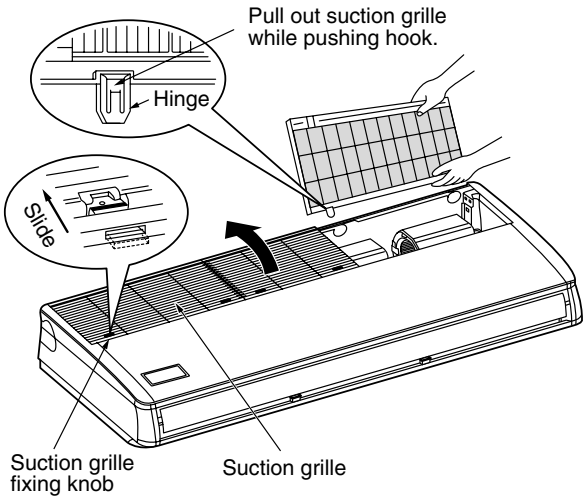


Before installation

1. Removal of suction grille

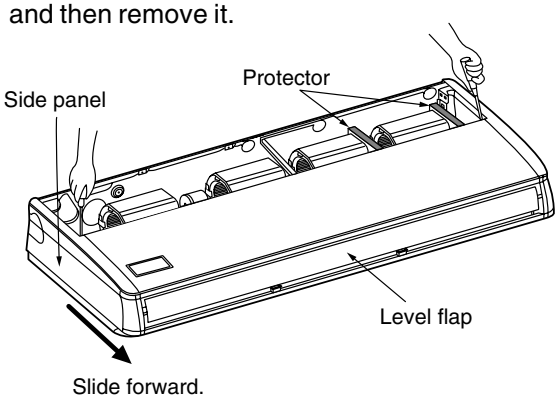
Slide the suction grille fixing knobs (two positions) toward the arrow direction, and then open the suction grille.

Under the condition of suction grille opened, push the hook section of hinges (two positions) at the rear side, and then pull out the suction grille.



2. Removal of side panel

After removing the side panel fixing screws (1 each at right and left), slide the side panel forward and then remove it.



3. Removal of protective vinyl

Peel out the protective vinyl on the level flap.

4. Removal of protector

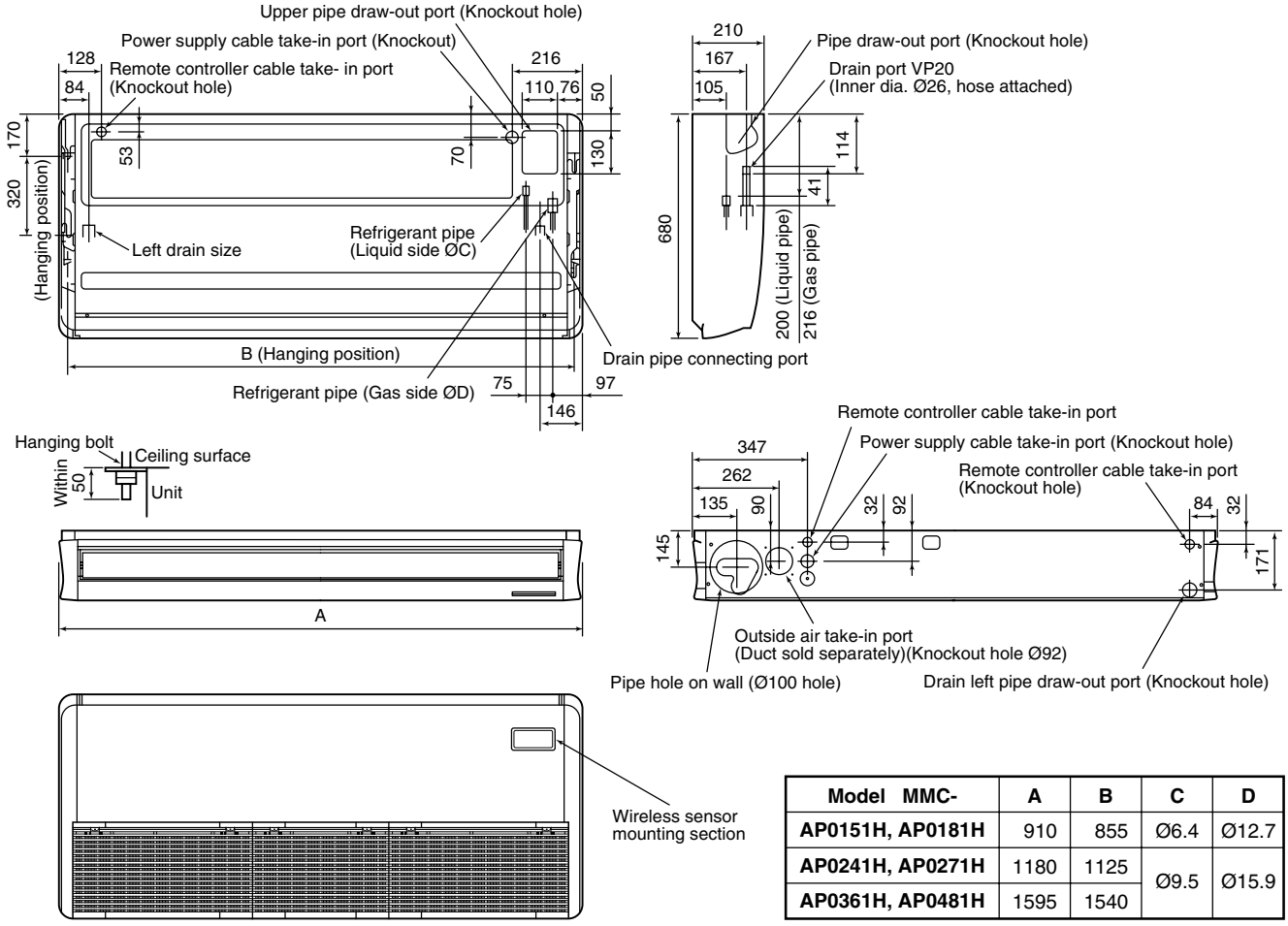
Remove the protectors (2 pcs.) of the fan. (MMC-AP0241H, AP0271H only)

External view

REQUIREMENT

Strictly comply with the following rules to prevent damage of the indoor units and human injury.

- Do not put a heavy article on the indoor unit. (Even units are packaged)
- Carry in the indoor unit as it is packaged if possible. If carrying in the indoor unit unpacked by necessity, be sure to use buffering cloth, etc. not to damage the unit.
- Do not apply force to the other parts (refrigerant pipe, drain pan, foamed parts, or resin parts, etc.).
- Carry the package by two or more persons, and do not bundle it with PP band at positions other than specified.


Upper pipe draw-out port (Knockout hole)
Power supply cable take-in port (Knockout)
Remote controller cable take- in port (Knockout hole)
Left drain size
Refrigerant pipe (Liquid side ØC)
Refrigerant pipe (Gas side ØD)
B (Hanging position)
Drain pipe connecting port
Pipe draw-out port (Knockout hole)
Drain port VP20 (Inner dia. Ø26, hose attached)
200 (Liquid pipe)
216 (Gas pipe)
Hanging bolt
Ceiling surface
Unit
Within 50
A
Remote controller cable take-in port
Power supply cable take-in port (Knockout hole)
Remote controller cable take-in port (Knockout hole)
Outside air take-in port (Duct sold separately)(Knockout hole Ø92)
Pipe hole on wall (Ø100 hole)
Drain left pipe draw-out port (Knockout hole)
Wireless sensor mounting section

Model MMC-	A	B	C	D
AP0151H, AP0181H	910	855	Ø6.4	Ø12.7
AP0241H, AP0271H	1180	1125	Ø9.5	Ø15.9
AP0361H, AP0481H	1595	1540		

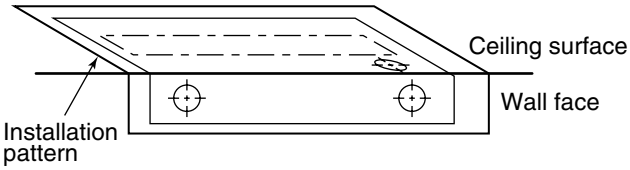
Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.

- If the ceiling has already been set before hanging the main unit, prepare refrigerant pipe, drain pipe, indoor connecting wire, remote controller cord, etc. up to the place where pipe and wire can be connected.
- Check the size of the indoor unit, and match the indoor unit size using the attached installation pattern.

How to use attached installation pattern

Using the pattern, positioning of the hanging bolt and pipe hole can be performed.

* As an error to some degree may generate on the pattern size due to temperature and humidity, be sure to confirm the size.

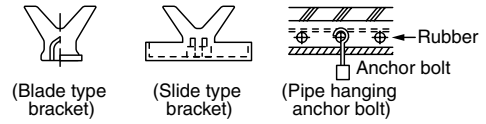


Installation of hanging bolts

Use M10 hanging bolts (4 pcs, to be local procure). Matching to the existing structure, set pitch according to size in the unit external view as shown below.

New concrete slab

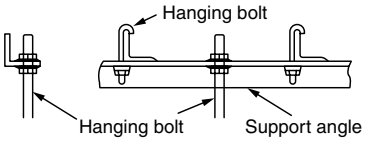
Install the bolts with insert brackets or anchor bolts.



(Blade type bracket) (Slide type bracket) (Pipe hanging anchor bolt)

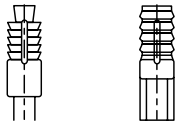
Steel flame structure

Use existing angles or install new support angles.



Existing concrete slab

Use a hole-in anchors, hole-in plugs, or a hole-in bolts.



Draw-out direction of pipe/cable

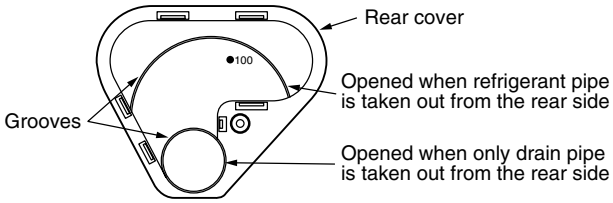
- Decide installation place of the unit and draw-out direction of pipe and cable.

Knockout hole of power cable take-in port

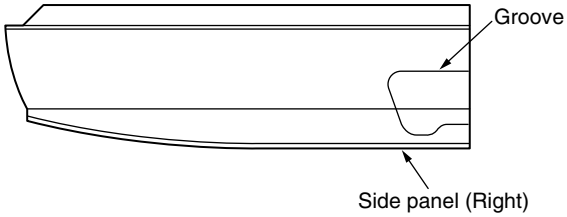
Open the power cable take-in port (Knockout hole) shown in the external view and then mount the attached bushing.

Pipe knockout hole

- **In case of taking pipe from the rear side**
  * Cut off the groove section with a plastic cutter, etc.


Rear cover
100
Opened when refrigerant pipe is taken out from the rear side
Grooves
Opened when only drain pipe is taken out from the rear side

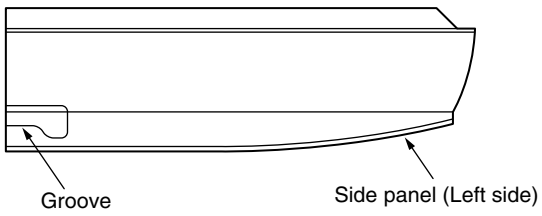
- **In case of taking pipe from right side**
  * Cut off the groove section with a metal saw or plastic cutter, etc.



- **In case of taking pipe from left side**

  Taking pipe from left side is applied only to the drain pipe.

  The refrigerant pipe cannot be taken out from the left side.
  * Cut off the groove section with a metal saw or plastic cutter, etc.



- **In case of taking pipe from upper side**

  Taking pipe from upper side is applied only to the refrigerant pipe.

  When taking out the drain pipe from the upper side, use a drain up kit sold separately.

  Open the upper pipe draw-out port (Knockout hole) shown in the external view.
  (Knockout hole of thin plate)

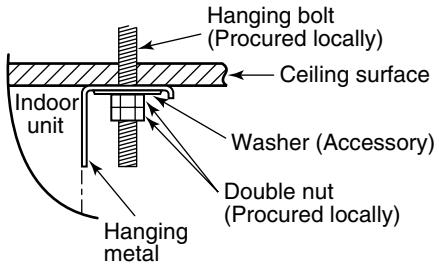
  After piping, cut off the attached thermal insulator of the top plate to pipe shape, and then seal the knockout hole.

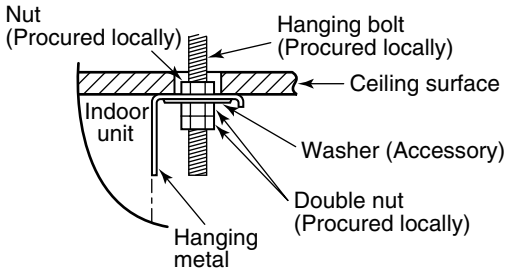
Installation of indoor unit

- **Preparation before holding down main unit**

  * Confirm the presence of the ceiling material beforehand because the fixing method of hanging metal when the ceiling material is set differs from that when the ceiling material is not set.

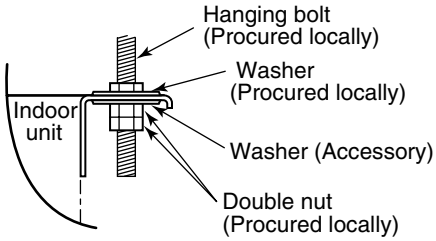
<There is ceiling material>





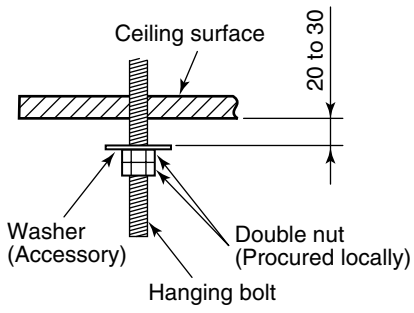
  * Tighten the hanging metal with upper/lower nuts as shown in the figure.

<There is no ceiling material>

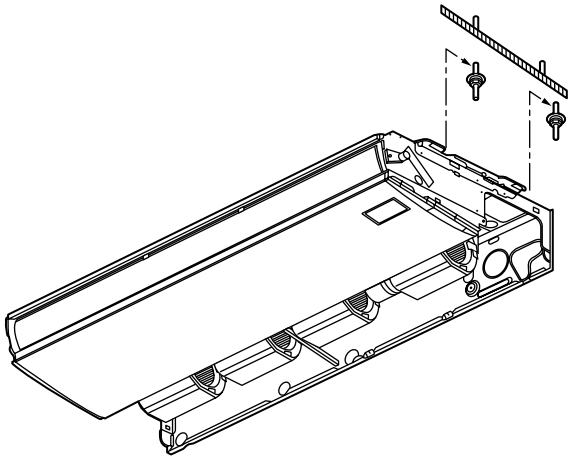


- **Holding down of main unit**

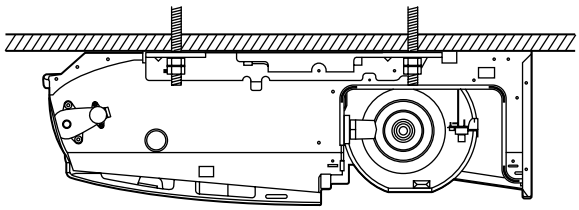
  1) Attach washer and nuts to the hanging bolt.



  2) Hang the unit to the hanging bolt as shown the figure below.



  3) As shown in the figure below, fix the ceiling material securely with the double nuts.



REQUIREMENT

- **The ceiling surface may not be horizontal. Be sure to confirm that width and depth directions are level.**

Installation of remote controller (Sold separately)

For installation of the wired remote controller, follow the Installation Manual attached with the remote controller.

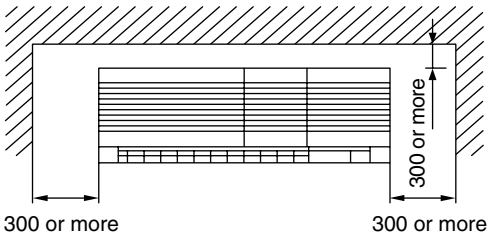
- Pull out the remote controller cord together with the refrigerant pipe or drain pipe.
  Be sure to pass the remote controller cord through upper side of the refrigerant pipe and drain pipe.
- Do not leave the remote controller at a place exposed to the direct sunlight and near a stove.
- Operate the remote controller, confirm that the indoor unit receives a signal surely, and then install it. (Wireless type)
- Keep 1m or more from the devices such as television, stereo, etc.
  (Disturbance of image or noise may generate.)
  (Wireless type)

6-9. High Wall Type (1 series)

Installation space

Reserve space required to install the indoor unit and for service work.

Keep 300mm or more for clearance between top plate of the indoor unit and the ceiling surface.



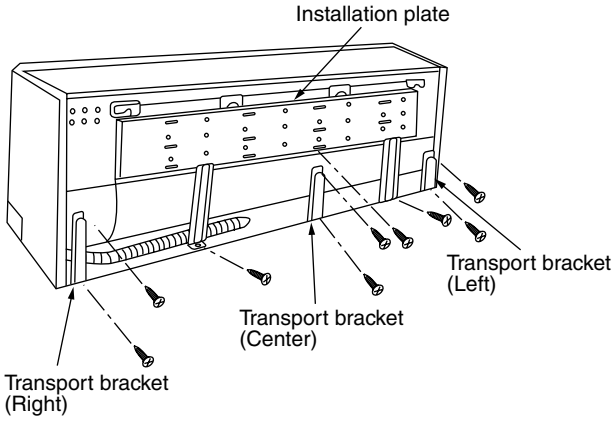
The transport brackets are provided. Following to the table, remove the brackets according to direction of pipe. (Left, right, center) (For AP0071H to AP0181H, only (left) and (right) transport brackets are provided.)

Pipe side piping	Parts to be removed
Right side piping	Remove transport bracket (right) only.
Rear side piping	
Left side piping	Remove all transport brackets.

REQUIREMENT

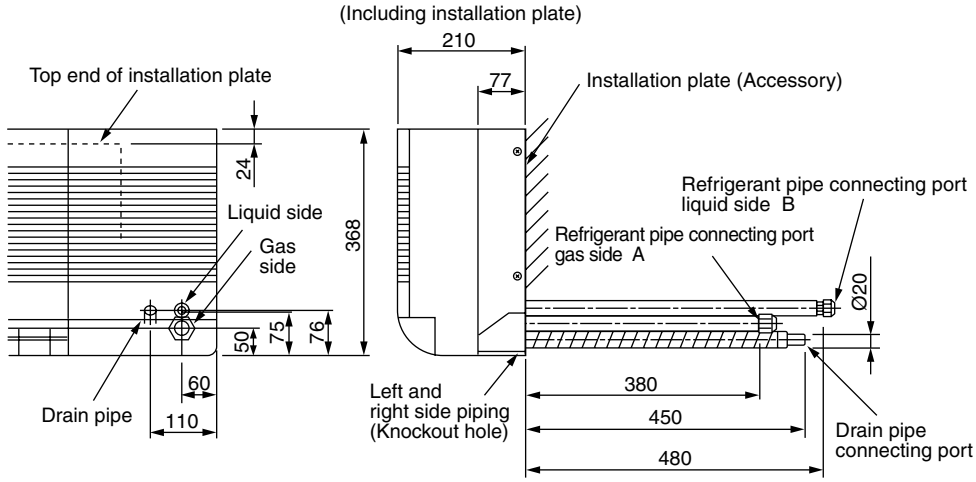
After removing of the transport brackets, do not apply force on the lower cabinet. It is to prevent deformation and breakage.

- Remove the installation plate.

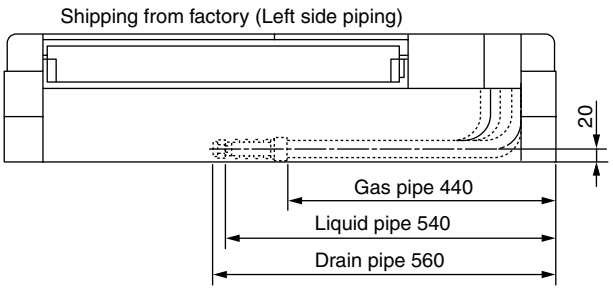


Pipe connecting position

<Front view>



<Bottom view>



Model MMK-	A	B
AP0071H to AP0121H	Ø9.5	Ø6.4
AP0151H, AP0181H	Ø12.7	Ø6.4
AP0241H	Ø15.9	Ø9.5

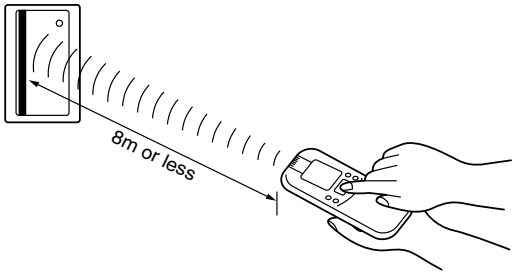
The lighting time setup of the filter sign (Notification of filter cleaning) of the remote controller can be changed according to the condition of installation. If the room is not heated due to the installation place or construction of the room, the detection temperature of heating can be raised.

For setup method, refer to “Change of lighting time of filter sign” and “To secure better effect of heating” in the Applicable controls of this Manual.

In case of wireless type

The sensor of indoor unit with wireless remote controller can receive a signal within approx. 8m. Based upon it, determine a place where the remote controller is operated and the installation place of the indoor unit.

- To prevent a malfunction, select a place where is not influenced by a florescent light or direct sunlight.
- Two or more (Up to 6 units) indoor units with wireless remote controller can be installed in the same room.



Installation of indoor unit

⚠ WARNING

Install the air conditioner certainly to sufficiently withstand the weight.

If the strength is insufficient, the unit may fall down resulting in human injury.

Perform a specified installation work to guard against strong wind or earthquake.

An incomplete installation can cause accidents by the units falling and dropping.

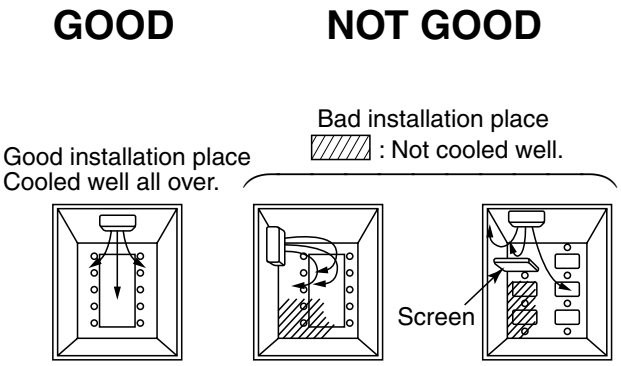
REQUIREMENT

Strictly comply with the following rules to prevent damage of the indoor units and human injury.

- Do not put a heavy article on the indoor unit. (Even units are packaged.)
- Carry in the indoor unit as it is packaged if possible. If carrying in the indoor unit unpacked by necessity, be sure to use buffering cloth, etc. not to damage the unit.
- To move the indoor unit, do not apply force to the refrigerant pipe, drain pan, foamed parts, or resin parts, etc.
- Carry the package by two or more persons, and do not bundle it with PP band at positions other than specified.

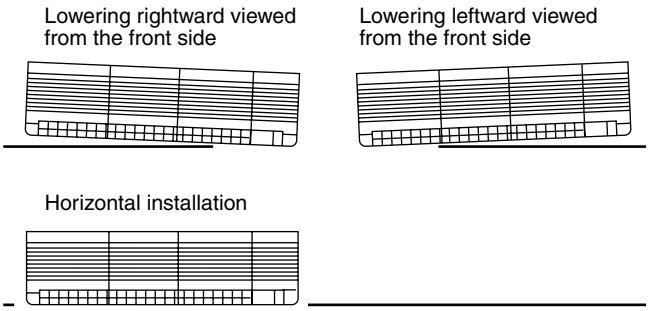
Be careful to the following items when installing the unit.

- Considering air discharge direction, select an installation place where discharge air can circulate evenly in a room. Avoid to install the unit at place with “**NOT GOOD**” mark in the following figure.

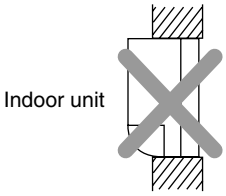


- To increase effect of drain, confirm the unit is installed horizontally or slightly lowering rightward viewed from the front side.

GOOD **NOT GOOD**



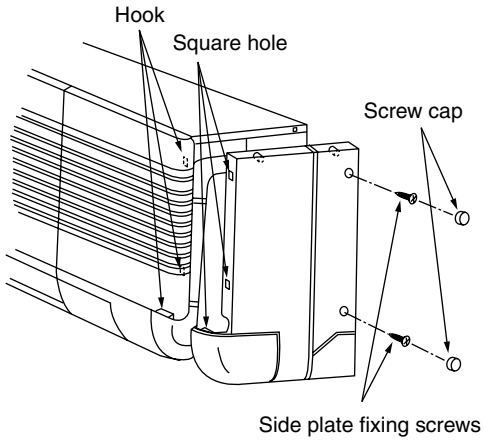
- Do not install the unit by plugging in the wall.



- The mass including installation plate of the indoor unit is shown in the following table. Check whether the wall has sufficient intensity.

Model MMK-	Mass (kg)
0071H to 0121H	20
0151H to 0181H	22
0241H	29

- When installing the side plate, check the status that hook is inserted in square hole. Push in the side plate until it is stuck closely to the indoor unit.



Installation of installation plate

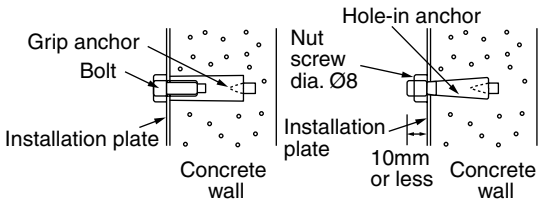
- Using the installation pattern, determine the installation position of the indoor unit, and drill the pipe hole matching with the position indicated in the installation pattern. When passing the refrigerant pipe through wall using metal mesh, be sure to use insulation sleeve such as polyvinyl chloride pipe.

■ In case of wooden construction (Wide wall)

(1) Determine vertical position of the installation plate by interval (height) between the indoor unit and the ceiling.
(2) Determine the position so that screw hole of installation plate locates at the center of pillar or stud by adjusting left/right position without changing height of the installation plate.
(3) Tighten the screws (accessory parts) after bore preholes with a gimlet in the stud to prevent the crack.

■ In case of reinforced concrete construction

(1) After drilling holes with interval by 150mm at the selected positions on the concrete wall, strike in grip anchor or hole-in anchor.
(2) Fix the installation plate to the anchor with bolt or nut. However, when using hole-in anchor, adjust drilling depth so that screw head-out is 10mm or less.



REQUIREMENT

- Conduit tube may be buried in the concrete wall. Ask the constructor it.
- Before installation of the indoor unit, be sure to check whether the installation plate has been completely installed.

■ In case of rear direction piping

Using the installation pattern, determine the pipe hole position, and drill a pipe hole slightly lowering downward.

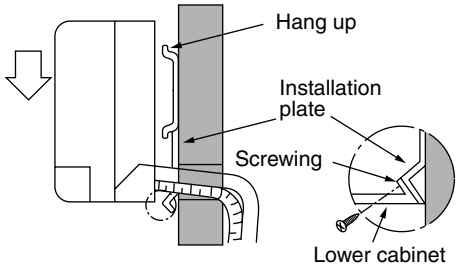
Installation of indoor unit

■ In case of rear and right direction piping

(1) Pass the drain pipe through the wall hole, and hang the indoor unit to the top end of the installation plate.

(2) Check that top end of the installation plate is inserted in by moving the indoor unit to left and right sides.

(3) Fix bottom end of the installation plate and the lower cabinet with screw so that the indoor unit does not move.



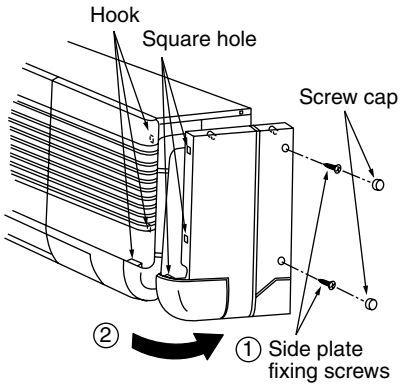
■ Removing of indoor unit right side plate

Remove the right side plate as the following procedure.

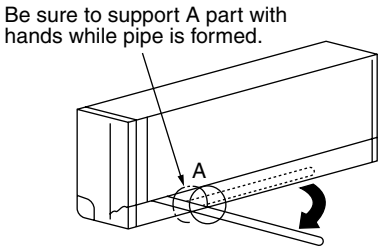
(1) Remove two side plate fixing screws.

(2) Remove the side plate by turning the gray colored part counter-clockwise to remove hooks in the square hole of the suction grille.

(3) When piping is in direction from right side, cut off the knockout of the side plate with knife, etc, and finish the end face.



■ In case of rear direction piping



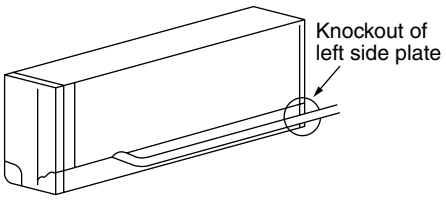
■ In case of left direction piping

Work after removing the lower cabinet.

(1) Remove the left/right side plates.

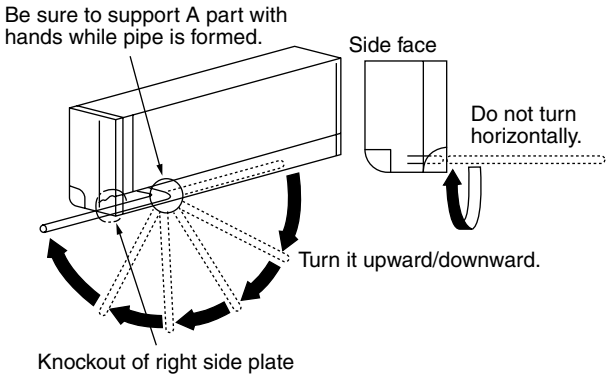
(2) Remove two screws of the lower cabinet.

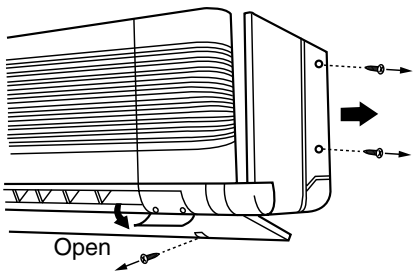
(3) Pull the lower cabinet toward you lowering a little.



■ In case of right direction piping

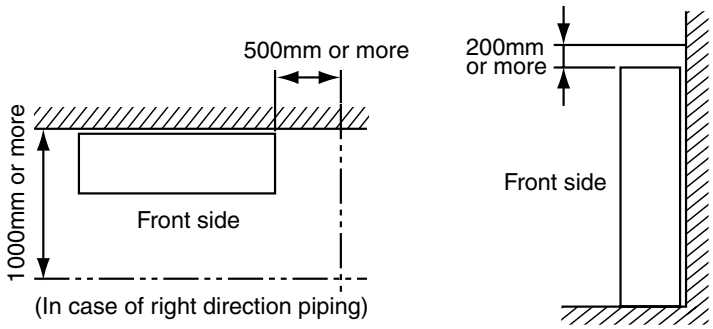
- Insert the right side plate observing click of the side plate. (Refer to right side plate installation drawing.)
- Fix the side plate, and cover the screw head with attached cap.


Be sure to support A part with hands while pipe is formed.
Side face
Do not turn horizontally.
Turn it upward/downward.
Knockout of right side plate



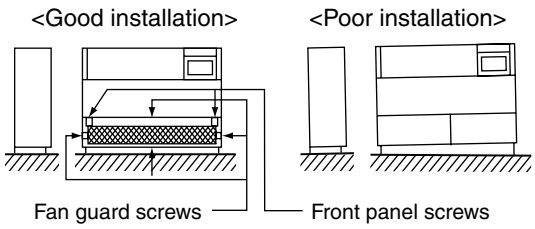
6-10. Floor Standing Cabinet Type

Installation space and service space



<Indoor unit>

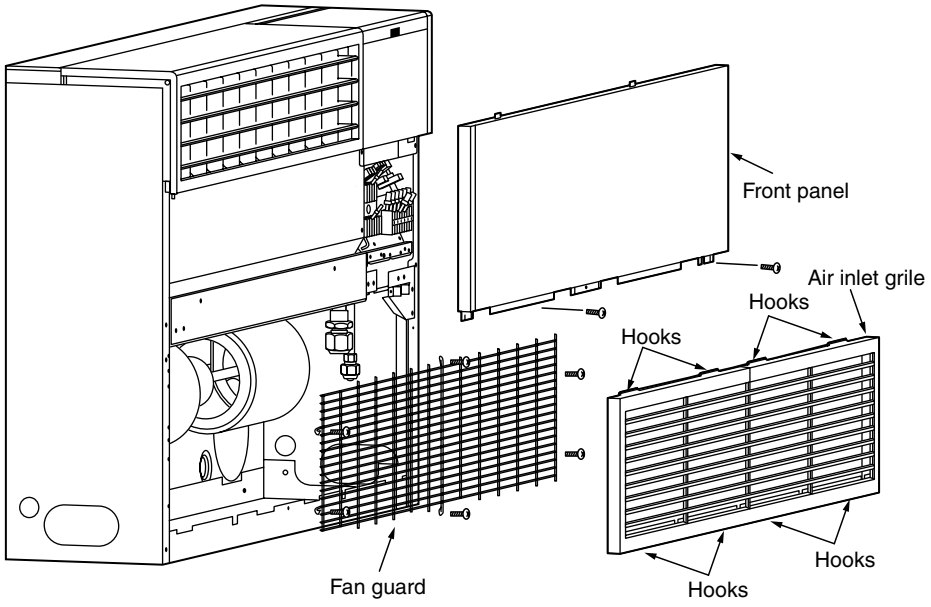
- **Install an indoor unit as described below.**



1. Prior to piping or electric work, remove the air inlet grille.
   (Push down the upper part slightly and pull it toward you.)
2. Remove the front panel.
   (Fixing screws at right and left sides of the lower side)
3. Remove the fan guard.
   (Fixing screws at right, center and left sides)
4. Then start piping and cabling works.
5. Keep the front space of the indoor unit as wider as possible.
   A wide space is required for maintenance and service works and then it is useful for distributing cool/hot air in the room resulted in increase of cooling/heating effect.
6. Install the indoor unit horizontally or slanting a little rightward viewed from the front side.

How to remove the panel before piping and electric wiring

1. Remove the air inlet grille (4 hooks at top and bottom each) and then remove the fan guard (6 screws) for piping work.
2. Remove the front panel (2 screws) for wiring work

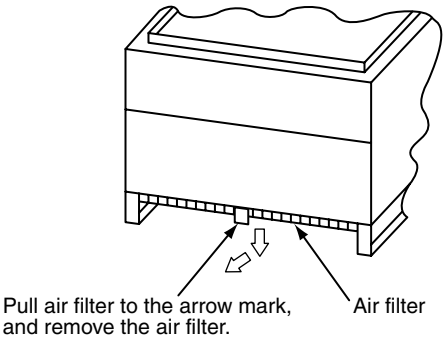


6-11. Floor Standing Concealed Type

Before installation

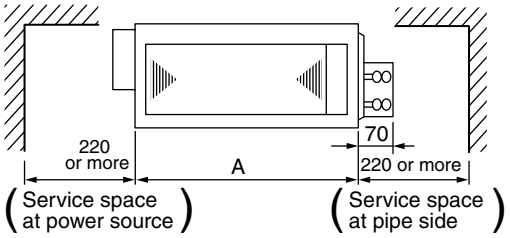
REQUIREMENT

- A drain filter to prevent drain clogging is attached to the indoor unit. Since the drain filter is attached outside of the unit, clogging due to dust, foreign matters may occur during work, be sure to clean the strainer before delivery. Please clean the drain filter in the periodical check.
- The air filter is provided under the main unit. Be sure to clean air filter before delivery.



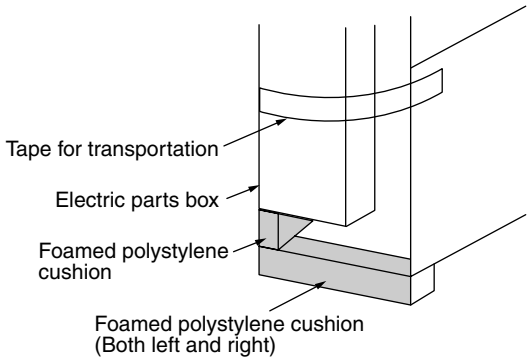
Installation space

Model MML-	A
AP0071BH to AP0121BH	610
AP0151BH to AP0241BH	910



Installation of indoor unit

1. Carry in the indoor unit as packaged up to installation place.
2. Remove foamed polystylene cushion for protection during transportation, which is entered under left/right side plate of the main unit and electric parts box.
   Also, when installing the unit, remove tape for transportation adhered to the electric parts box.
3. Install the indoor unit before lining the wall.


Tape for transportation
Electric parts box
Foamed polystylene cushion
Foamed polystylene cushion (Both left and right)

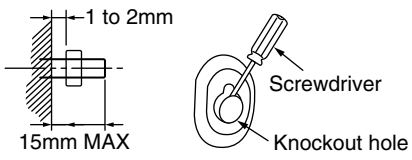
<Fixing of unit>

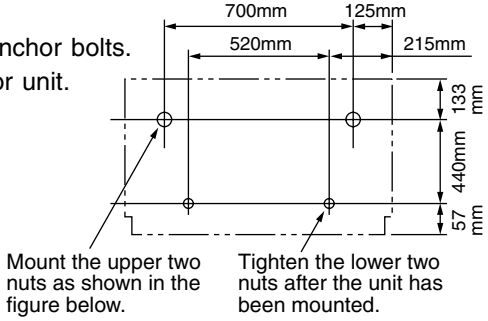
Fix the indoor unit to the floor and wall by attaching two or four M8 anchor bolts to the position in the following figure to tighten and fix with nut utilizing holes at left/right side plates.

In case of fixing the indoor unit to wall

Fix the indoor unit to the wall as described below.

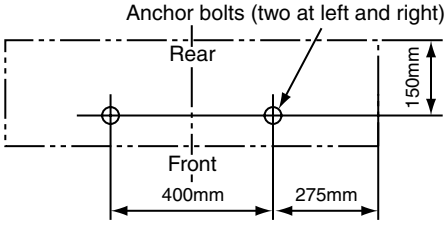
1. Referring to the following figure, fix four M8 anchor bolts to the wall.
2. As shown in the figure, attach the bolts preciously to the upper two anchor bolts.
3. Using a screwdriver, etc, open knockout hole at rear side of the indoor unit.
4. Hang the indoor unit to the anchor bolts.
5. Tighten the nuts to the two lower anchor bolts.



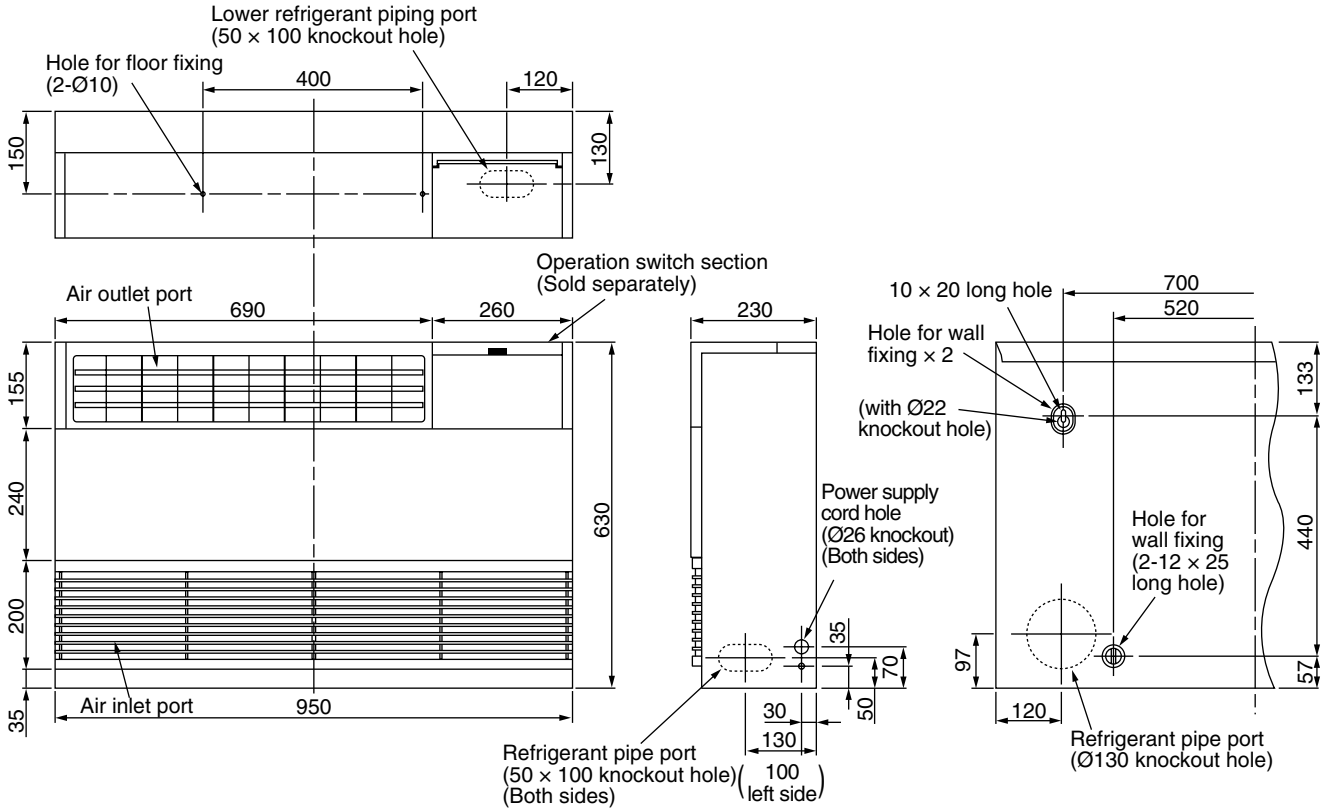


In case of fixing the indoor unit to floor

To fix the indoor unit to the floor, pass two anchor bolts attached on the floor through a hole of the bottom plate of the indoor unit, and then tighten and fix it with the nuts.



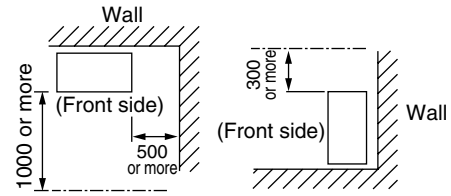
External view

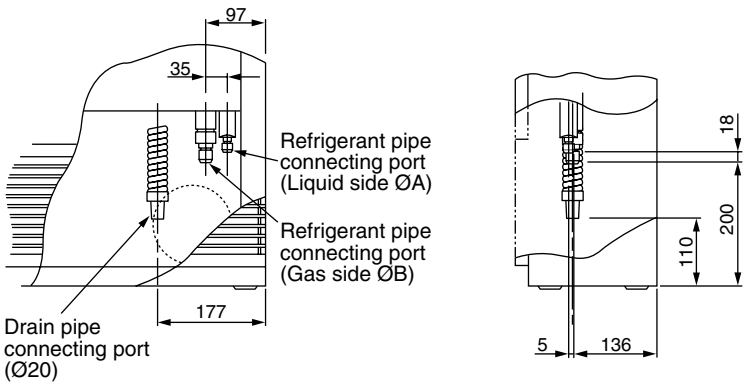


Dimensions

Model MML-	A	B
AP0071H, AP0091H, AP0121H	Ø6.4	Ø9.5
AP0151H, AP0181H	Ø6.4	Ø12.7
AP0241H	Ø9.5	Ø15.9

Space required for service
(Figure shows piping at the right side)





Piping positional drawing

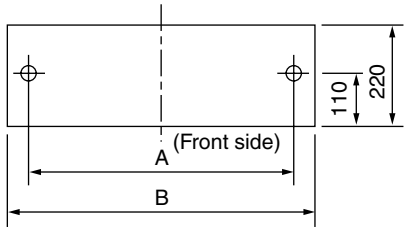
Installation of remote controller (Sold separately)

For installation of the wired remote controller, follow the Installation Manual attached with the remote controller.
For installation of the wireless remote controller, follow to the Installation Manual attached to the remote controller.

- Do not put the remote controller on the place where is exposed to direct sunlight or near a stove, etc.
- Operate the remote controller, check the indoor unit surely receives the signal, and then install the remote controller. (Wireless type)
- Install the remote controller 1m apart from the devices such as TV or stereo. (Image may be disturbed or noise may be output.) (Wireless type)

In case of fixing indoor unit to floor

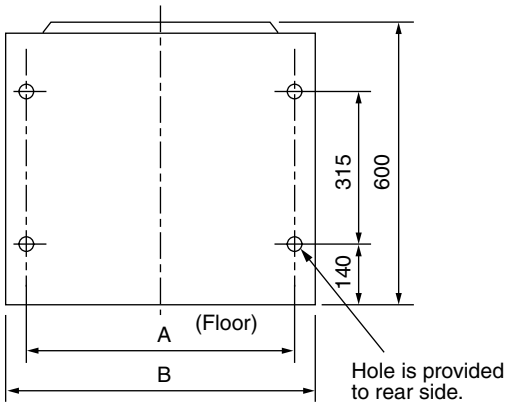
<Indoor unit viewed from overhead>



Model MML-	A	B
AP0071BH to AP0121BH	580	610
AP0151BH to AP0241BH	880	910

In case of fixing indoor unit to wall

<Indoor unit viewed from front side>



Model MML-	A	B
AP0071BH to AP0121BH	580	610
AP0151BH to AP0241BH	880	910

* Attach and fix the electric parts box to the wall under condition that electric parts box to be attached to the side face is removed. Remove the electric parts box as follows.

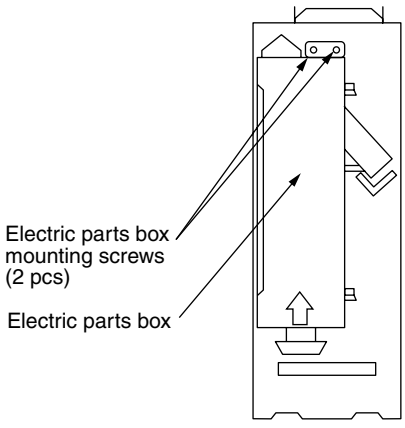
<How to remove the electric parts box>

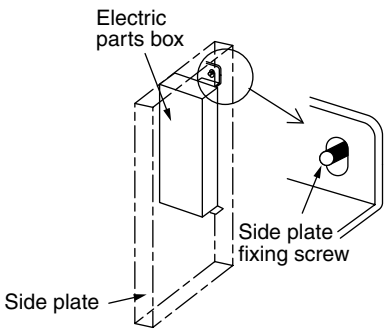
1. Remove two mounting screws at upper side of the electric parts box.
2. Slide the electric parts box to the arrow mark, and remove it from the set.

Installation of remote controller (Sold separately)

For installation of the wired remote controller, follow to the Installation Manual attached to the remote controller.

- Pull out the remote controller cord together with the refrigerant pipe or drain pipe. Be sure to pass the remote controller cord through upper side of the refrigerant pipe and drain pipe.



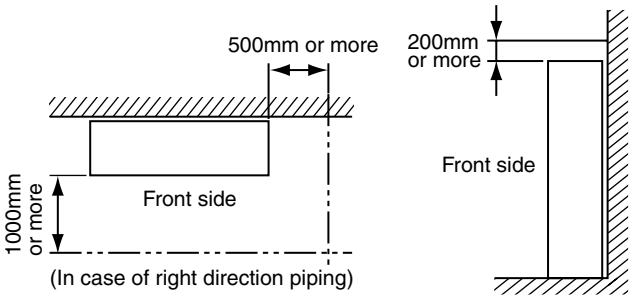


Installation space

<Installation space>

REQUIREMENT

When using the air conditioner under condition of high humidity, attach the thermal insulator to the side face and the rear side of the indoor unit.



Unit fixing bolt

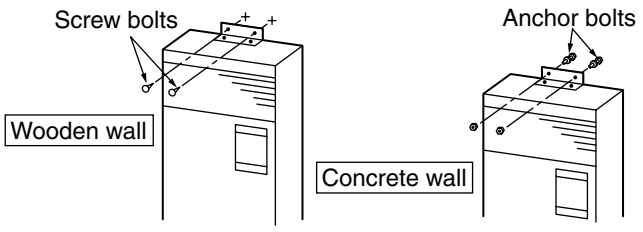
- In case of wooden wall and wooden floor (AP0151 Model to AP0271 Model)
  Use the four screw bolts (M8 × L50) for transportation and the two screw bolts attached to inside of the indoor unit.
- In case of wooden wall and wooden floor (AP0361 Model to AP0561 Model)
  Use the two screw bolts (M8 × L50) for transportation and the four screw bolts attached to inside of the indoor unit.
- In case of models other than the above
  Procure the six anchor bolts (M8 × L50 or longer) at the local site.

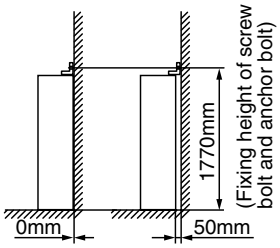
In case of fixing the indoor unit to the wall surface

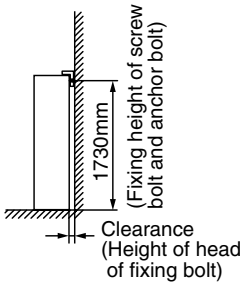
Use the attached wall fixing bracket by inverting it at upper side of the unit. Fix the indoor unit to the wall surface using the attached screw bolts, anchor bolts or etc. at two positions. A many holes for fixing the indoor unit to wall surface and for fixing the indoor unit itself are provided on the bracket. Sliding the bracket right and left sides, select a position which can securely fix the indoor unit and then fix it.

A hole on the wall fixing bracket for the indoor unit is a long hole. Therefore the indoor unit can be fixed at any position keeping clearance from 0 to 50mm.

As shown below, it is also possible to fix the indoor unit without inverting the bracket. (In this case, keep clearance with length of head of the bolt between the indoor unit and the wall.)

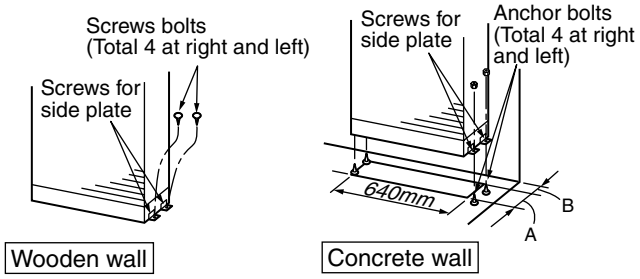






In case of fixing the indoor unit to the floor

Use the attached the attached floor fixing bracket to fix the lower right and left sides of the indoor unit to the floor. To fix to the indoor unit, use the side plate screws and use the screw bolts or anchor bolts for fixing to the floor respectively, and then fix the indoor unit at total four positions, two positions for right and left each.

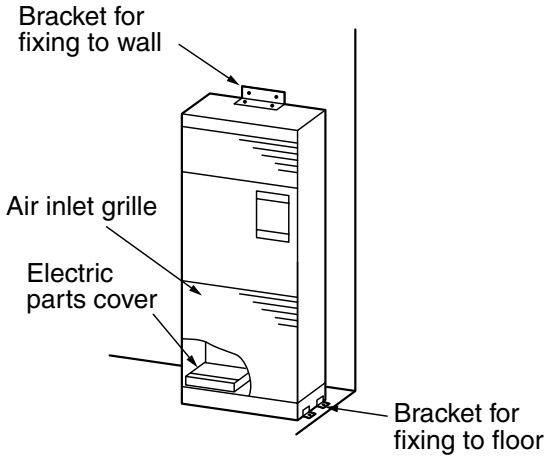


Model MMF-	A mm	B mm
AP0151H to AP0271H type	88	42 to 92
AP0361H to AP0561H type	258	52 to 102

Indoor unit fixing figure (Example)

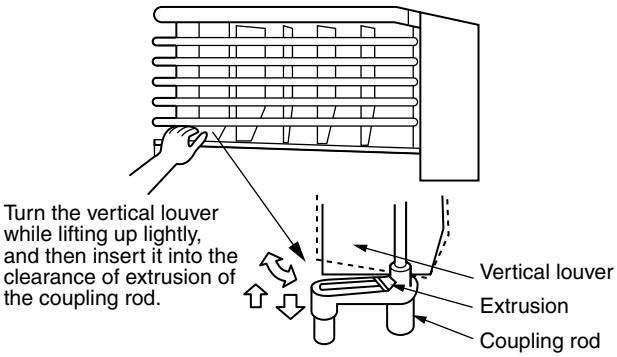
REQUIREMENT

In case of installing the indoor unit to the floor and the wall other than wooden floor and wall, the six anchor bolts (M8 × L50 or longer) are required. Procure them at the local site.



Direction of vertical louver

The direction of the auto turn louver (Vertical louver) may change during transportation. As shown below, lift up the vertical louver lightly, turn it matching with the direction of the plastic coupling rod, insert it into clearance of the extrusion, and then arrange the direction of the vertical louver to the desired direction.



Installation of remote controller (Sold separately)

For installation of the wired remote controller, follow the Installation Manual attached with the remote controller.

For installation of the wireless remote controller, follow to the Installation Manual attached to the remote controller.

- Draw out the remote controller cord together with the refrigerant pipe or drain pipe. Be sure to put the remote controller cord at upper side of the refrigerant pipe or drain pipe.
- Do not put the remote controller on the place where is exposed to direct sunlight or near a stove, etc.
- Operate the remote controller, check the indoor unit surely receives the signal, and then install the remote controller. (Wireless type)
- Install the remote controller 1m apart from the devices such as TV or stereo. (Image may be disturbed or noise may be output.) (Wireless type)

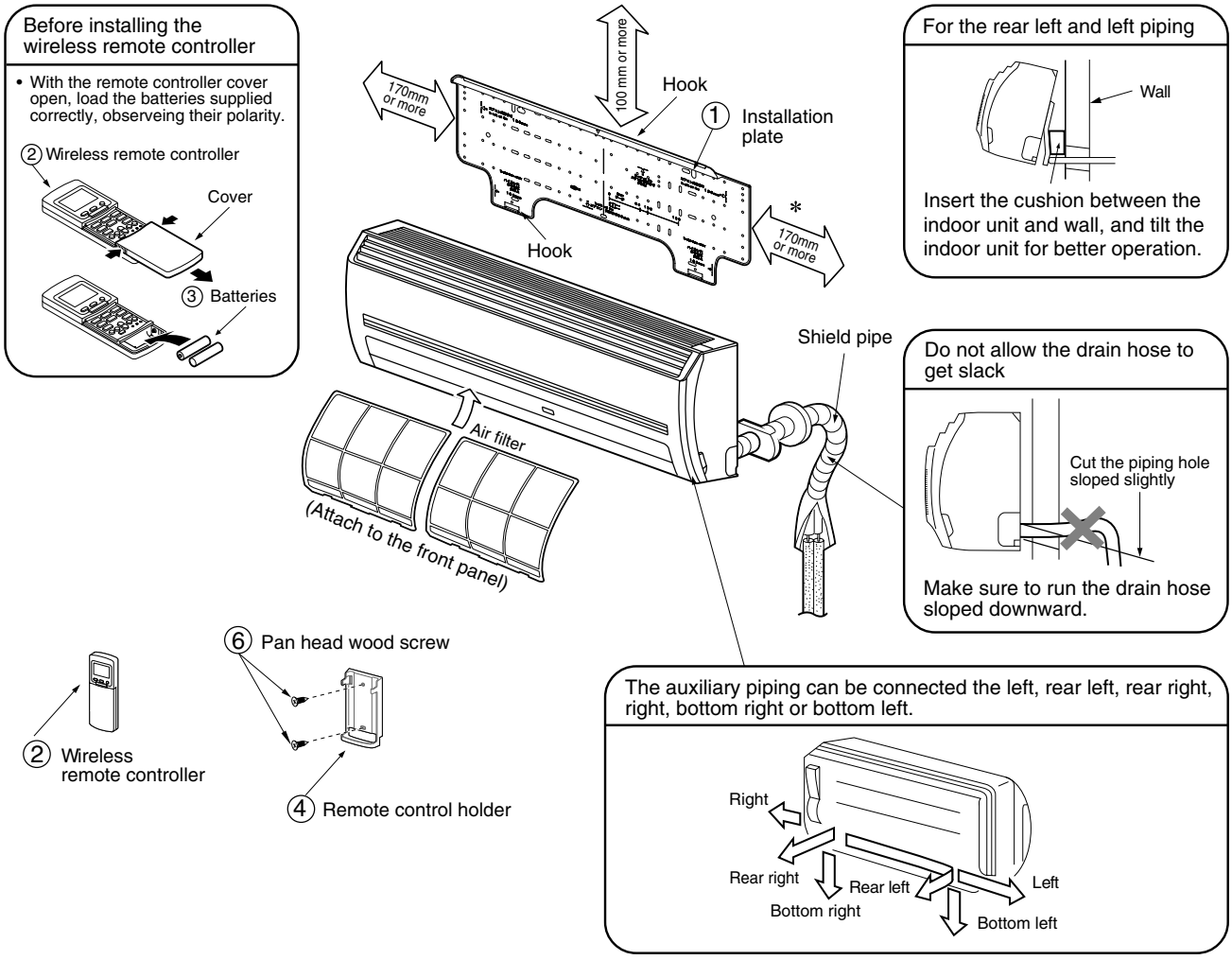
6-12. High Wall Type (2 series)

Installation space

Reserve space required to install the indoor unit and for service work.

Keep 100mm or more for clearance between top plate of the indoor unit and the ceiling surface.

Installation diagram of Indoor and outdoor units


Before installing the wireless remote controller
• With the remote controller cover open, load the batteries supplied correctly, observeing their polarity.
② Wireless remote controller
Cover
③ Batteries
100 mm or more
170mm or more
Hook
① Installation plate
Hook
*
170mm or more
Shield pipe
Air filter
(Attach to the front panel)
For the rear left and left piping
Wall
Insert the cushion between the indoor unit and wall, and tilt the indoor unit for better operation.
Do not allow the drain hose to get slack
Cut the piping hole sloped slightly
Make sure to run the drain hose sloped downward.
⑥ Pan head wood screw
② Wireless remote controller
④ Remote control holder
The auxiliary piping can be connected the left, rear left, rear right, right, bottom right or bottom left.
Right
Rear right
Rear left
Left
Bottom right
Bottom left

* When installing the Flow Selector Unit (FS Unit), keep a space more than 300mm for wiring work.

Installation place

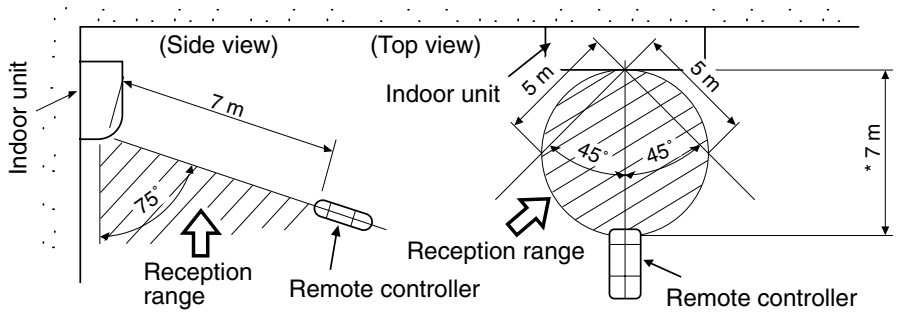
- A place which provides the spaces around the indoor unit as shown in the above diagram.
- A place where there is no obstacle near the air inlet and outlet.
- A place that allows easy installation of the piping to the outdoor unit.
- A place which allows the front panel to be opened.

⚠ CAUTION

- Direct sunlight to the indoor unit' s wireless receiver should be avoided.
- The microprocessor in the indoor unit should not be too close to RF noise sources.

Remote controller

- A place where there are no obstacles such as a curtain that may block the signal from the remote controller.
- Do not install the remote controller in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Keep the remote controller at least 1m apart from the nearest TV set or stereo equipment. (This is necessary to prevent image disturbances or noise interference.)
- The location of the remote controller should be determined as shown below.



* : Axial distance

⚠ WARNING

Install the air conditioner certainly to sufficiently withstand the weight.

If the strength is insufficient, the unit may fall down resulting in human injury.

Perform a specified installation work to guard against strong wind or earthquake.

An incomplete installation can cause accidents by the units falling and dropping.

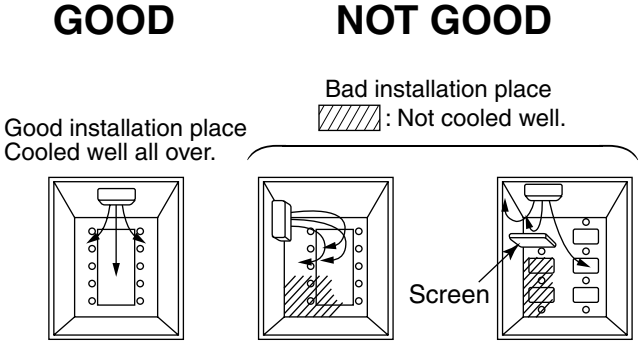
REQUIREMENT

Strictly comply with the following rules to prevent damage of the indoor units and human injury.

- Do not put a heavy article on the indoor unit. (Even units are packaged.)
- Carry in the indoor unit as it is packaged if possible. If carrying in the indoor unit unpacked by necessity, be sure to use buffering cloth, etc. not to damage the unit.
- To move the indoor unit, do not apply force to the refrigerant pipe, drain pan, foamed parts, or resin parts, etc.
- Carry the package by two or more persons, and do not bundle it with PP band at positions other than specified.

Be careful to the following items when installing the unit.

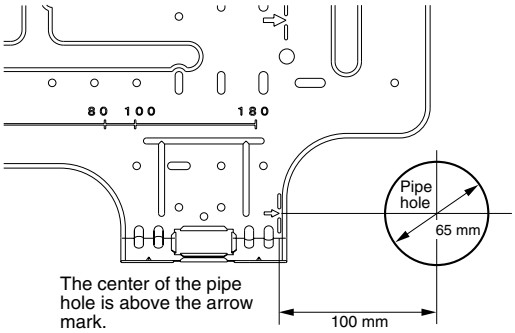
- Considering air discharge direction, select an installation place where discharge air can circulate evenly in a room. Avoid to install the unit at place with "**NOT GOOD**" mark in the right figure.



Cutting a hole

In case of installing the refrigerant pipes from the rear:

1. Decide the hole position for piping at 100mm from the arrow mark (⇨) on the installation plate and drill a hole with Ø65mm at a slight downward slant toward outdoor side.

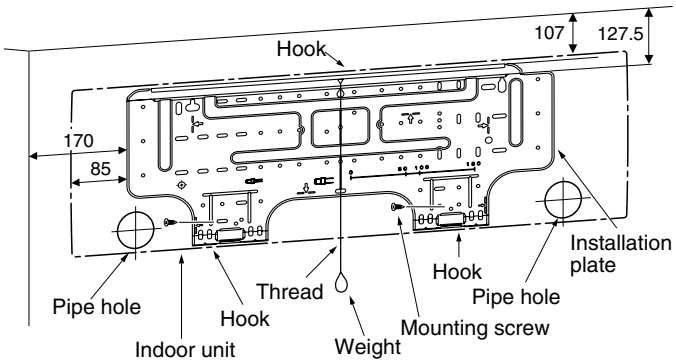


NOTE

- When drilling a wall that contains a metal lath, wire lath or metal plate, be sure to use a pipe hole brim ring sold separately.

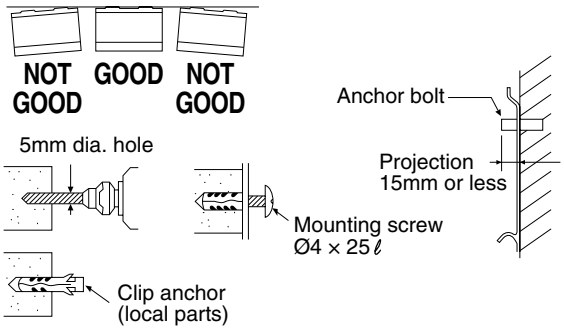
Mounting the installation plate

For installation of the indoor unit,
use the paper pattern in the accessory parts.



When the installation plate is directly mounted on the wall

1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up the indoor unit.
2. To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as illustrated in the above figure.
3. Install the installation plate horizontally in the wall.



⚠ CAUTION

When installing the installation plate with a mounting screw, do not use the anchor bolt hole.
Otherwise the unit may fall down and result in personal injury and property damage.

⚠ CAUTION

Failure to firmly install the unit may result in personal injury and property damage if the unit falls.

- In case of block, brick, concrete or similar type walls, make 5mm dia. holes in the wall.
- Insert clip anchors for appropriate mounting screws used for the installation plate.

NOTE

- Secure four corners and lower parts of the installation plate with 4 to 6 mounting screws to install it.

7. FLOW SELECTOR UNIT INSTALLATION

This SUPER HRM Air Conditioner is a new type which adopts a new refrigerant HFC (R410A) instead of the conventional refrigerant R22 in order to prevent destruction of the ozone layer.

Be sure to use an indoor or outdoor unit in combination with the new refrigerant.

- This Flow Selector unit is for the new refrigerant HFC (R410A).
- To connect the Flow Selector unit to an outdoor unit with pipes, a branching joint or header is required. Choose one according to the capacity of the units.
- Nitrogen gas is filled in the selection unit.
  Be careful when removing flare nuts.

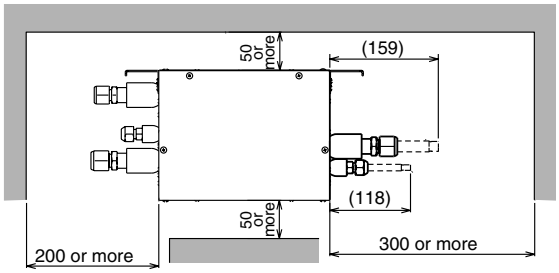
7-1. Accessory Parts

Part name	Q'ty RBM-		Shape	Usage
	Y1122FE	Y1802FE		
Installation Manual	1	1	—	(Be sure to hand over to customers.)
Attached wire (For power supply)	1	1		For power supply from indoor unit (3-core, 6m)
Attached wire (For control wiring)	1	1		For communication with indoor unit (5-core, 6m)
Heat insulating pipe	3	3		For heat insulating of suction gas, discharge gas, and gas pipe connecting sections
Heat insulating pipe	2	2		For heat insulating of liquid pipe connecting section
Attached pipe	1	—		Ø9.5 - Ø6.4, connection pipe
Attached pipe	1	—		Ø15.9 - Ø12.7, connection pipe
Attached pipe	1	—		Ø15.9 - Ø9.5, connection pipe
Wire joint	2	2		For connection with certain indoor units

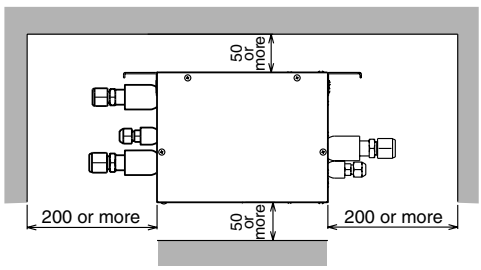
7-2. Installation Space

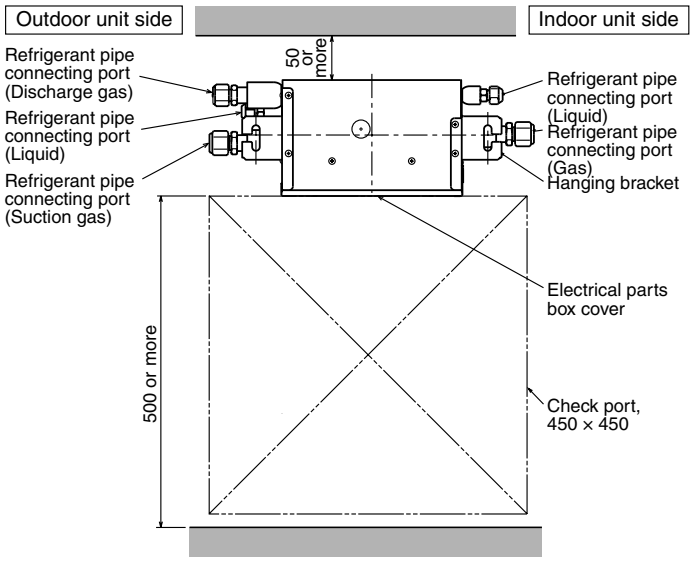
- Make space for installation and service. (Make space to the electrical parts box cover side for service.)
- When installing the unit inside the ceiling, be sure to create a check port.
  The check port is required when the unit is installed and serviced. (Check port: 450*450 or more)
- Keep a clearance of 50 mm or more between the top panel of the unit and the ceiling.
- The length of a connection pipe to the indoor unit should be 5m or less when the attached wires are used.
  15m as the maxium length by using the connection cable kit. (RBC-CBK15FE, sold sepalatrly.)

<RBM-Y1122FE (When attached pipes are used)>

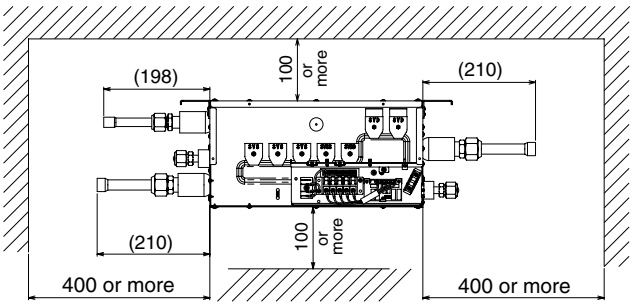


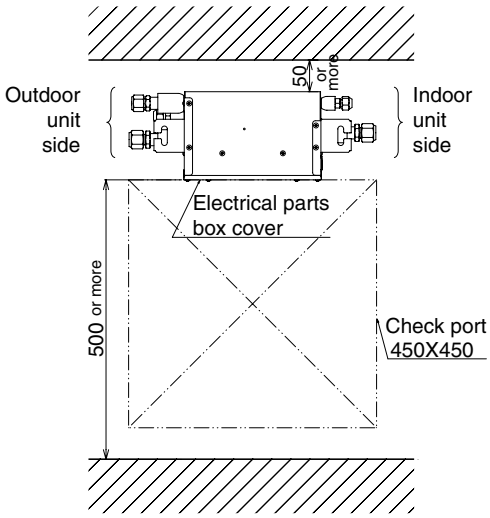
<RBM-Y1122FE, RBM-Y1802FE>




Outdoor unit side
Indoor unit side
Refrigerant pipe connecting port (Discharge gas)
Refrigerant pipe connecting port (Liquid)
Refrigerant pipe connecting port (Suction gas)
50 or more
Refrigerant pipe connecting port (Liquid)
Refrigerant pipe connecting port (Gas)
Hanging bracket
Electrical parts box cover
500 or more
Check port, 450 × 450

<RBM-Y2802FE (when attached pipes are used)>





7-3. Installation of Flow Selector Unit

⚠ WARNING

Install the unit securely in the place to sufficiently withstand the weight of the unit.

If the foundation is not sturdy enough, the unit may fall and cause personal injury.

Perform a specified installation work to guard against earth quake.

Improper installation may cause the unit to fall.

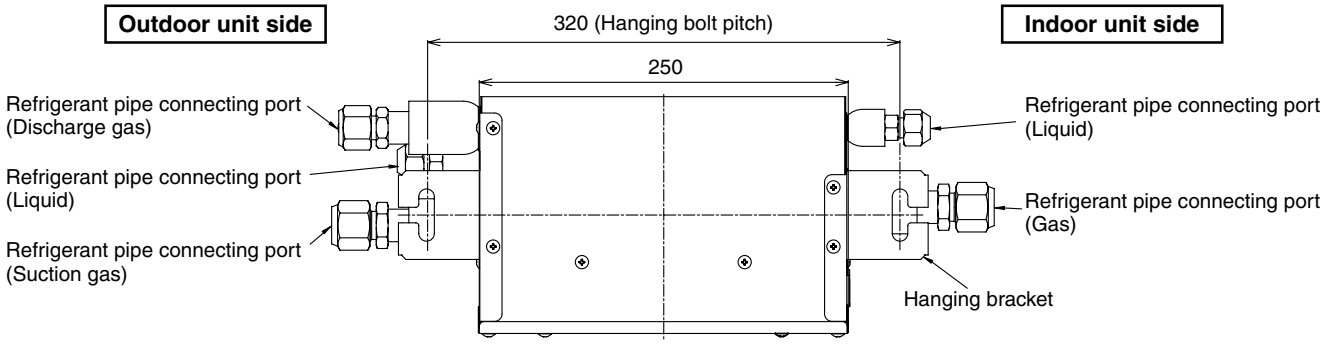
REQUIREMENT

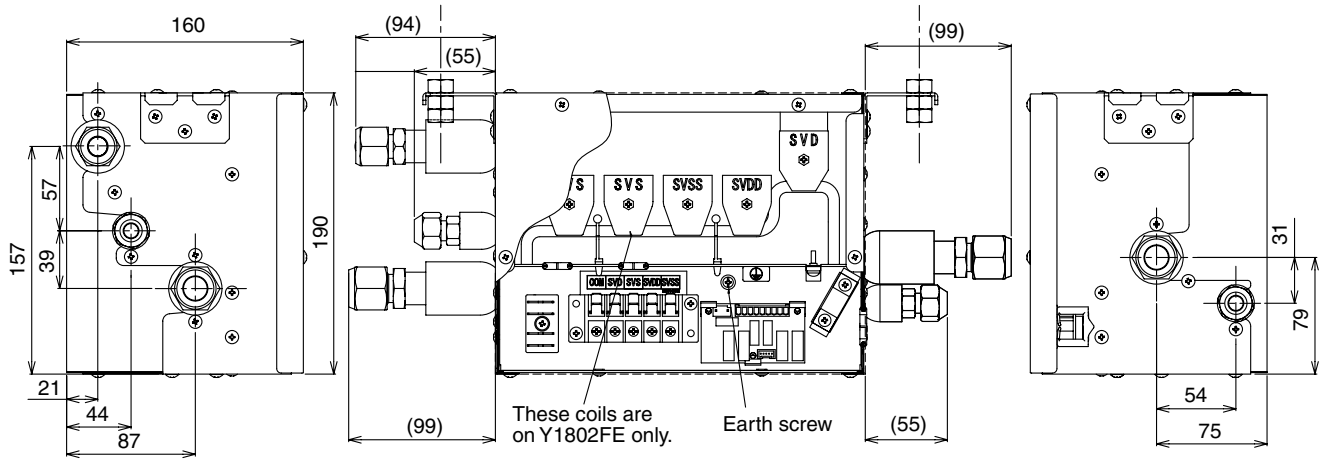
To prevent damage on the Flow Selector unit or personal injury, follow the instructions below.

- Do not step, or put any heavy object on the packed Flow Selector unit.
- When carrying the Flow Selector unit, hold the two hanging brackets and be careful not to apply excessive force to the refrigerant pipes.

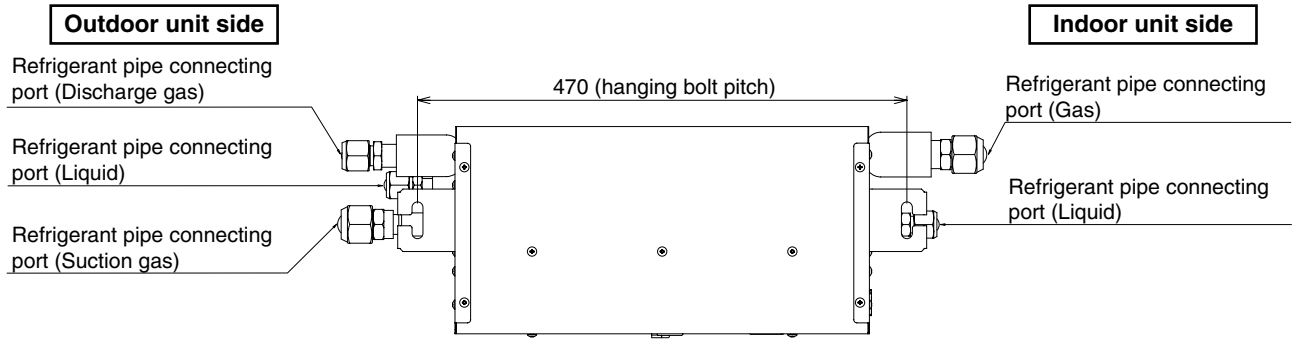
External view

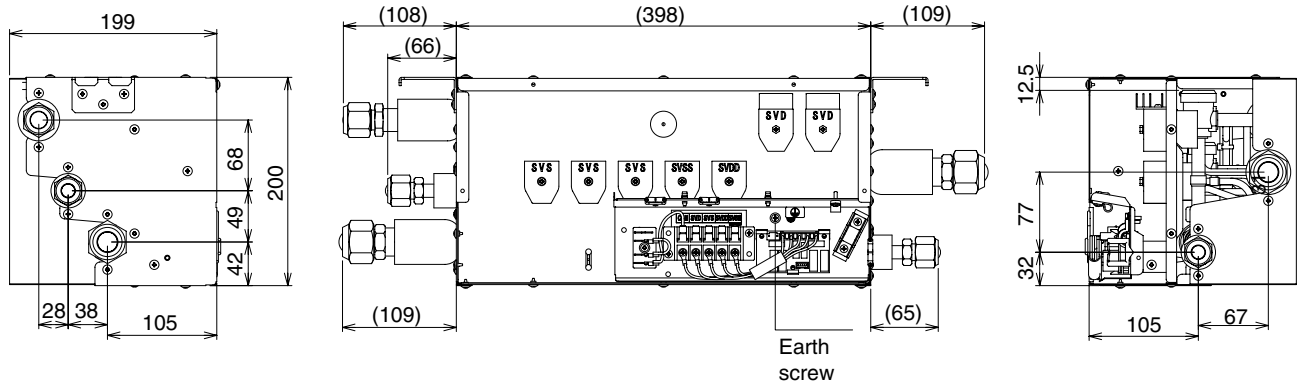
RBM-Y1122FE/Y1802FE


Outdoor unit side
320 (Hanging bolt pitch)
Indoor unit side
250
Refrigerant pipe connecting port (Discharge gas)
Refrigerant pipe connecting port (Liquid)
Refrigerant pipe connecting port (Suction gas)
Refrigerant pipe connecting port (Liquid)
Refrigerant pipe connecting port (Gas)
Hanging bracket



RBM-Y2802FE


Outdoor unit side
Indoor unit side
Refrigerant pipe connecting port (Discharge gas)
Refrigerant pipe connecting port (Liquid)
Refrigerant pipe connecting port (Suction gas)
470 (hanging bolt pitch)
Refrigerant pipe connecting port (Gas)
Refrigerant pipe connecting port (Liquid)



Installing hanging bolts

- Considering piping and wiring work after hanging the Flow Selector unit, determine the installation position and direction.
- After determining the installation position of the Flow Selector unit, install the hanging bolts.
- For hanging bolt pitch, see the External View.
- When the ceiling is already installed, draw the pipes to the position where they are to be connected before hanging the unit.

Procure hanging bolts and nuts locally for installing the unit.

Hanging bolt	M10 (mm) or W3/8	2 pieces
Nut	M10 (mm) or W3/8	6 pieces
Flat washer	M10 (mm)	4 pieces

Ceiling preparation

Because ceiling preparation depends on the building structure, consult with the architect or interior finisher.

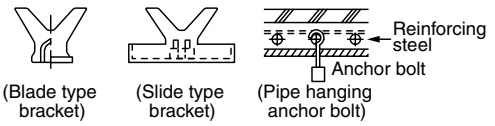
After removing the ceiling panels, it is important to reinforce the ceiling frames to prevent ceiling panel vibration and to keep the ceiling horizontal.

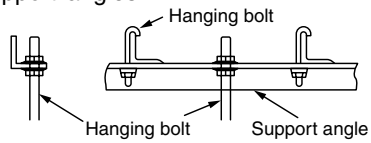
Installation of hanging bolt

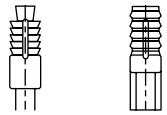
Use M10 hanging bolts (2 pcs, to be local procure).

Matching to the existing structure, set pitch according to size in the unit external view as shown below.

New concrete slab	Steel flame structure	Existing concrete slab
Install the bolts with insert brackets or anchor bolts.	Use existing angles or install new support angles.	Use a hole-in anchors, hole-in plugs, or a hole-in bolts.

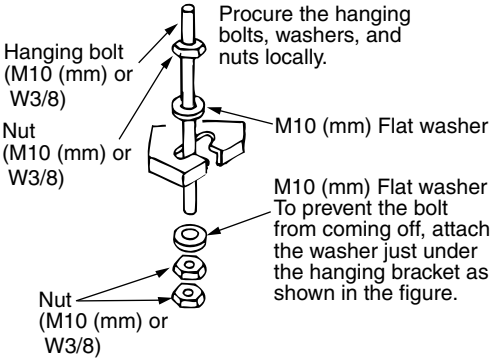


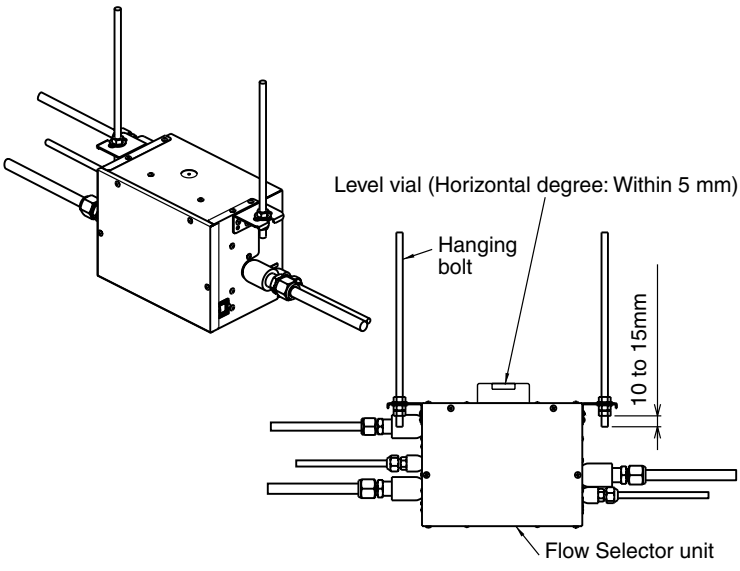




Installing Flow Selector unit

- Attach the nuts (M10 (mm) or W3/8: local supply) and flat washers (M10: local supply) to the hanging bolts.
- Put the washers over and under the T-groove of the hanging brackets of the Flow Selector unit to hang down the unit.
- Using a level vial, check that the four sides are horizontal. (Horizontal degree: Within 5 mm).


Procure the hanging bolts, washers, and nuts locally.
Hanging bolt (M10 (mm) or W3/8)
Nut (M10 (mm) or W3/8)
M10 (mm) Flat washer
M10 (mm) Flat washer
To prevent the bolt from coming off, attach the washer just under the hanging bracket as shown in the figure.
Nut (M10 (mm) or W3/8)



REQUIREMENT

Install the Flow Selector unit with the correct direction as shown in the figure.

If installed with incorrect direction, the Flow Selector unit will not operate properly.

7-4. Refrigerant Piping

⚠ WARNING

If refrigerant gas has leaked during the installation work, ventilate the room immediately.

If the leaked refrigerant gas comes in contact with fire, noxious gas may be generated.

After the installation work, confirm that refrigerant gas does not leak.

If refrigerant gas leaks into the room and flows near a fire source, such as a fan heater, cooking stove or heating unit, noxious gas may be generated.

Permissible pipe length and permissible height difference

The length of a connection pipe to the indoor unit should be 5 m or less.

For details, refer to the installation manual attached to the outdoor unit.

REQUIREMENT

When the refrigerant pipe is long, set the support brackets to fix the pipe at intervals of 2.5 to 3 m. If the pipe is not fixed, noise may be generated.

Be sure to use the flare nuts attached to the Flow Selector unit or ones for R410A.

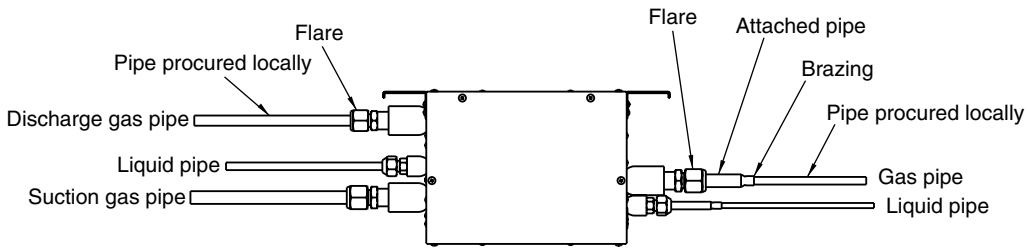
Piping material and dimensions

RBM-Y1122FE/Y1802FE

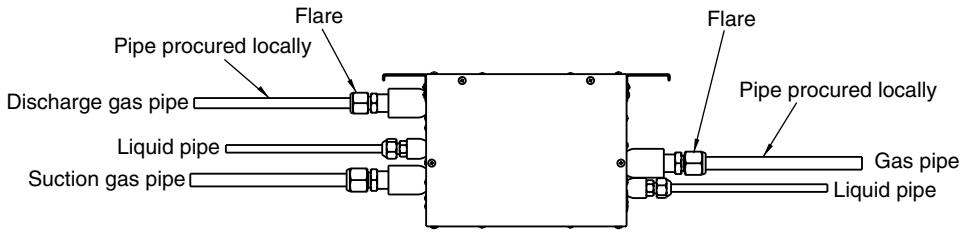
Material	Seamless phosphorus deoxidized copper pipe for air-conditioning				
FS unit	RBM-Y1122FE				RBM-Y1802FE
Indoor unit	MM -AP	007-012	015-018	024-030	036-056
Indoor unit side pipe size (mm)	Gas pipe	*Ø9.5	*Ø12.7	Ø15.9	Ø15.9
	Liquid pipe	*Ø6.4	*Ø6.4	Ø9.5	Ø9.5
Outdoor unit side pipe size (mm)	Suction gas pipe	Ø15.9	Ø15.9	Ø15.9	Ø15.9
	Discharge gas pipe	Ø12.7	Ø12.7	Ø12.7	Ø12.7
	Liquid pipe	Ø9.5	Ø9.5	Ø9.5	Ø9.5

* Use pipes attached with the FS unit. The pipes are not flared. Flare them when using them.

<RBM-Y1122FE (When attached pipes are used)>



<RBM-Y1122FE, RBM-Y1802FE>

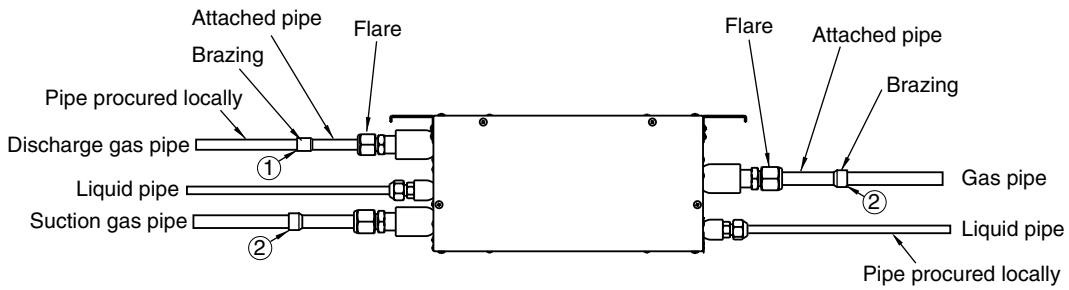


RBM-Y2802FE

Model name		RBM-Y2802FE		Accessory pipe
		Connecting port	Connecting method	
Indoor unit side	Liquid side	Ø12.7	Flare	
	Gas side	* Ø22.2	Flare	② Ø19.1 (Flare) → Ø22.2 (Brazing)
Outdoor unit side	Liquid side	Ø12.7	Flare	
	Discharge gas side	* Ø15.9	Flare	① Ø15.9 (Flare) → Ø19.1 (Brazing)
	Suction gas side	* Ø22.2	Flare	② Ø19.1 (Flare) → Ø22.2 (Brazing)
Total capacity of indoor unit (kW)		18.0 to 28.0 or less		
Power Supply		Single phase 50Hz 230V (220-240V)		
Total Weight		8 kg		
Dimension (mm)		Height 200 X Width 398 X Depth 199		

* Use pipes attached with the FS unit.

<RBM-Y2802FE (When attached pipes are used)>



8. OUTDOOR UNIT INSTALLATION

8-1. Selecting a Location for Installation

⚠ CAUTION

Check that it is installed at a place where flammable gas does not leak.

If gas leaks and accumulates on surroundings of the unit, combustion may be caused.

Check that the outdoor unit is fixed to the base.

Otherwise, an accident such as falling may be caused.

REQUIREMENT

- Avoid a location where a machine is generating high frequency.
- Using the air conditioner at a specific location where spray of oil (including machine oil) or steam is possible, salty location such as seaside, or place where gas sulfide generates such as hot spring may cause a trouble.

  If doing so, a special maintenance is required. For details, contact the dealer which you purchased it.
- Avoid obstruction of inlet port and outlet port of the outdoor unit so there is no restriction of air flow.
- Avoid to installing the air conditioner in a location where strong wind blows against the inlet or outlet port of the outdoor unit.
- When using the air conditioner at the snow area, mount a snowfall frame or hood to the outdoor unit.

  For details, contact the dealer which you purchased the air conditioner.
- Drain water from the outdoor unit to a place having good drainage.
- Set TV or radio 1m or more apart from the main unit of air conditioner or remote controller.

  Quality of picture or noise may be affected.

Attention to operation sound

- Select a location with sufficient strength, where operation sound or vibration does not transmit to other entities, or does not increase.
- If an obstacle is put on the near outlet port of the outdoor unit, operation sound may increase.
- Select a position where neighbors are not affected by discharge air from the discharge port of the outdoor unit or the operation sound.

Electric wiring

⚠ WARNING

Check that earthing practice is correctly performed.

Grounding is necessary. If earthing practice is incomplete, an electric shock may be caused.

⚠ CAUTION

Check the electrical leakage breaker is fitted.

It is necessary to fit an electrical leakage breaker. Otherwise, an electric shock may be caused.

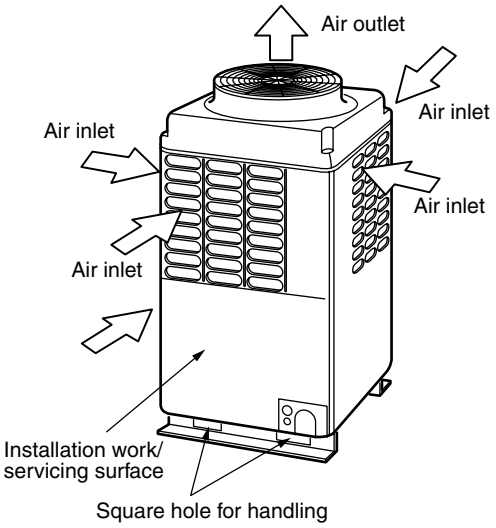
Only use fuses with the correct capacity.

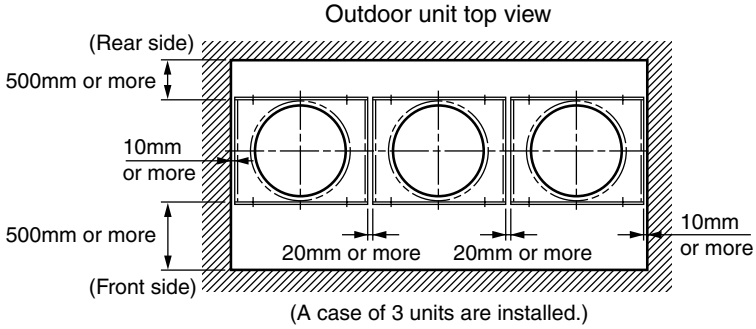
Using wire or copper wire may cause a fire or trouble.

For the power source, use a circuit with rated voltage exclusive for air conditioner.

Installation space

1. Align the servicing surfaces of the outdoor units and connect them for installation.
2. Considering functions, reserve space necessary for construction and servicing.
   (The figure at lower right side shows a case that 3 units are installed connectively.





NOTES :

(1) If there is an obstacle at upper side of the outdoor unit, reserve space of 2000mm or more up to the top end of the outdoor unit.

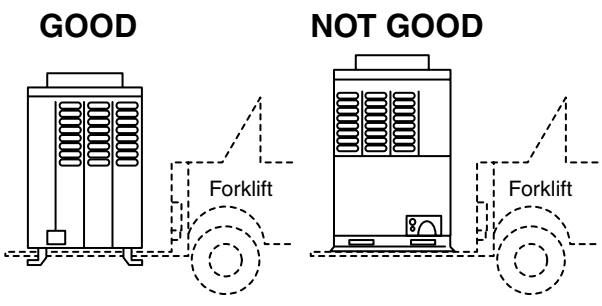
(2) Install the outdoor unit so that height of obstacle surrounding the outdoor unit is kept 800mm or less from the bottom end of the outdoor unit.

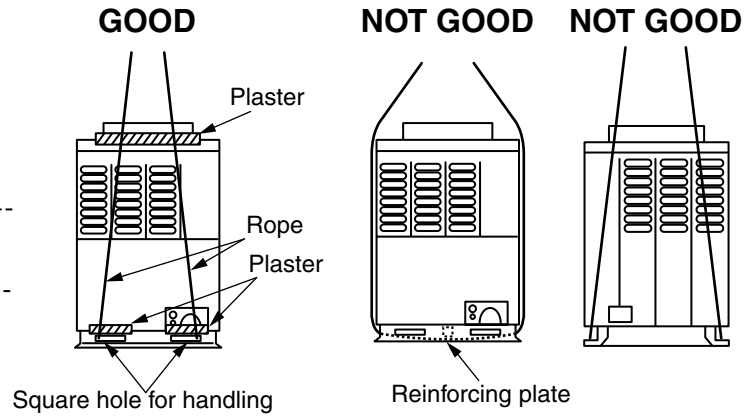
(3) If height of obstacle surrounding the outdoor unit is higher than the outdoor unit, measures such as discharge duct being installed is required.

[1] Outdoor unit carrying in

Handle the outdoor unit in care with the following items.

1. When using a forklift, etc for loading/unloading in transportation, insert pawl of the forklift into the square hole for handling as shown below.
2. When lifting up the unit, insert a rope sufficiently bearable to unit mass into the square hole for handling, and cord the unit from four sides. (Apply a plaster to position where rope fits outdoor unit itself so that flaw or deformation does not generate on the outer surface of the outdoor unit.)
   (There provided the reinforcing plates on the side surfaces, so the rope cannot be passed.)





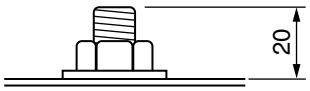
[2] Installation of outdoor unit

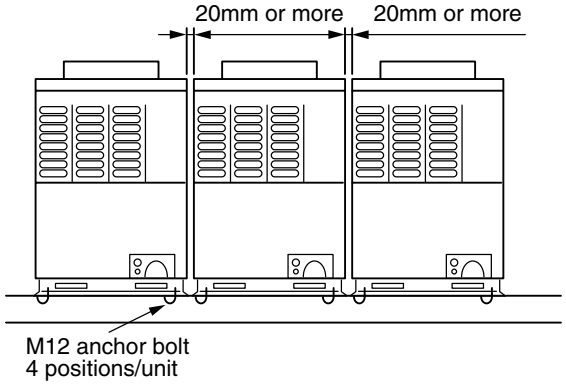
⚠ WARNING

- **Perform a specified installation work against a strong wind such as typhoon or earthquake.**

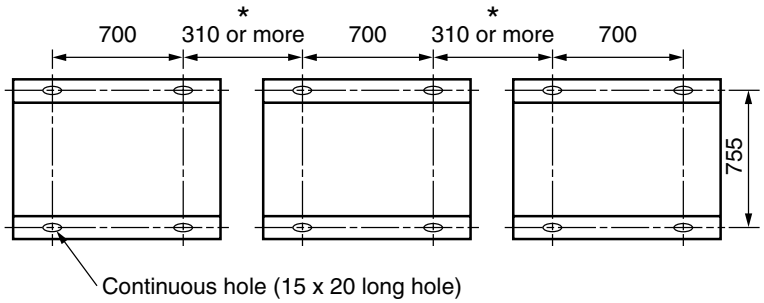
  If the air conditioner is imperfectly installed, an accident by falling or dropping may be caused.

1. Arrange the outdoor units with 20mm or more intervals. Fix the outdoor unit with M12 anchor bolts (4 positions/unit). 20mm is appropriate to length of anchor bolt.



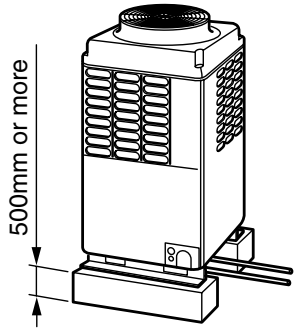


- Anchor bolt pitch is as shown below.

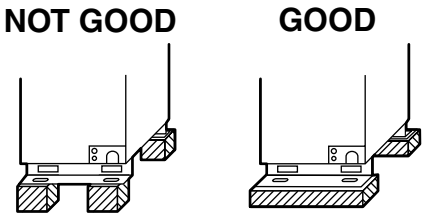


***** However, piping equivalent length should not exceed 25m between the outdoor unit nearest to the indoor unit and the farthest outdoor unit from the indoor unit on piping path in one refrigerating cycle system.

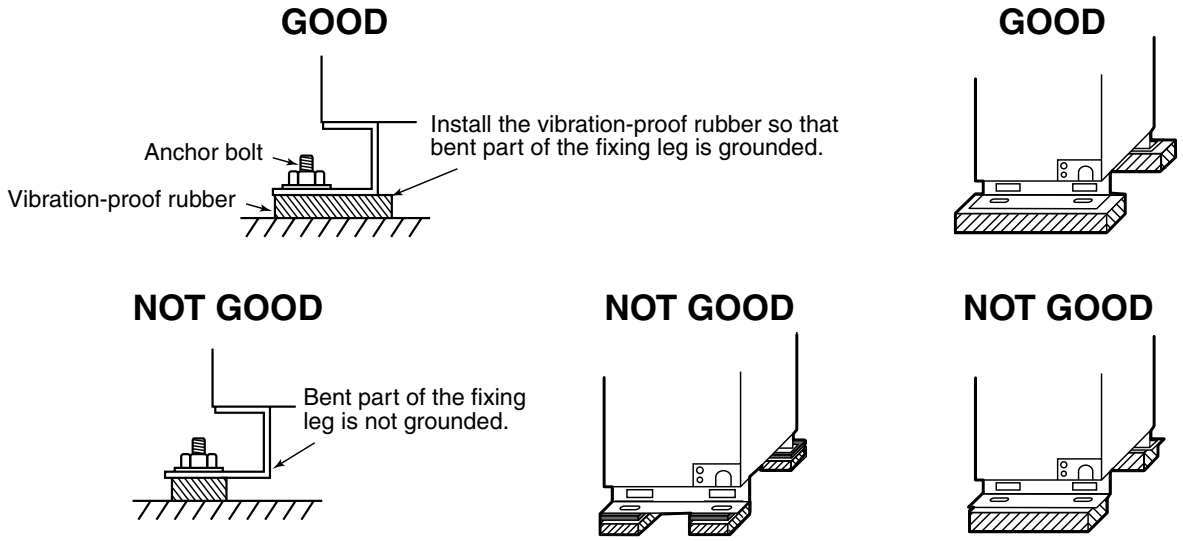
2. When taking the refrigerant pipe from underside, set height of the stool by 500mm or more.



3. Do not use four stools to set the four corners.



4. Mount the vibration-proof rubber (vibration-proof block etc.) so that it catch whole the clamping leg.



5. Be careful to connecting arrangement of the header unit and the follower units.
   Set the outdoor units in the order from one with large capacity. (A (Header unit) ≥ B ≥ C)
6. Be careful to connecting arrangement of header unit and follower unit.
   1) Be sure to use a header unit for the leading outdoor unit to be connected to the main pipe. (Figure 1)
   2) However, as shown in the figure below, T-shape branching joint which is sold separately can be connected to connect to the main pie within piping indicated with a bold line in the following figure. (Figure 2)
   3) Be careful to direction of T-shape branching joint. (As shown in Figure 3, T-shape branching joint cannot be attached so that refrigerant of the main pipe flows directly to the header unit.)

Figure 1 **GOOD**

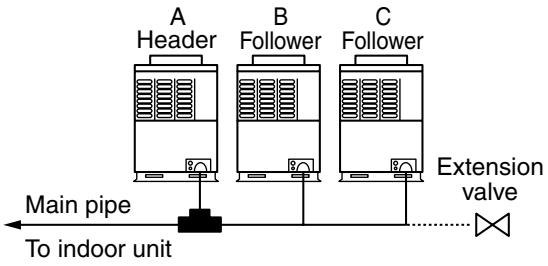


Figure 2 **GOOD**

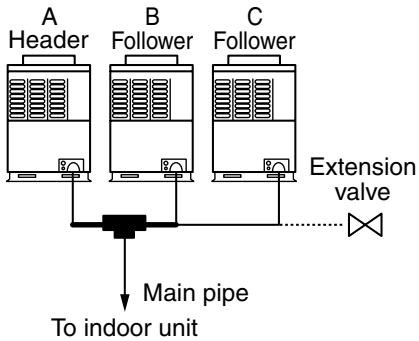
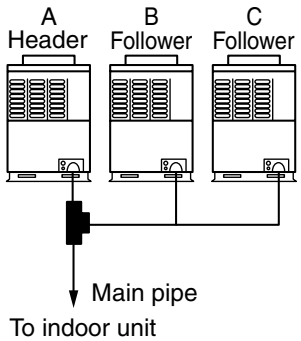


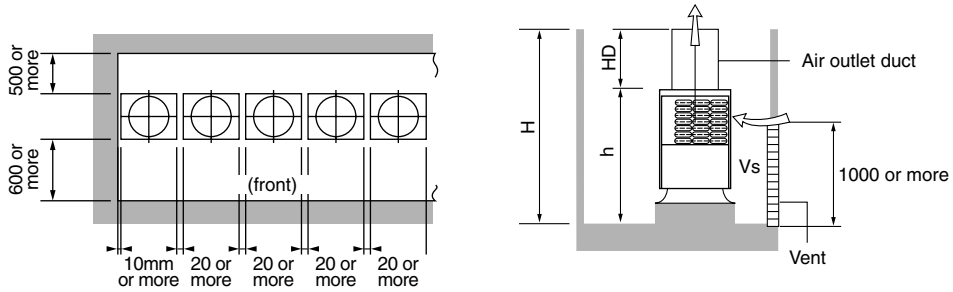
Figure 3 **NOT GOOD**



8-2. Standards for Rooftop Collective Installation

When outer wall is taller than outdoor units

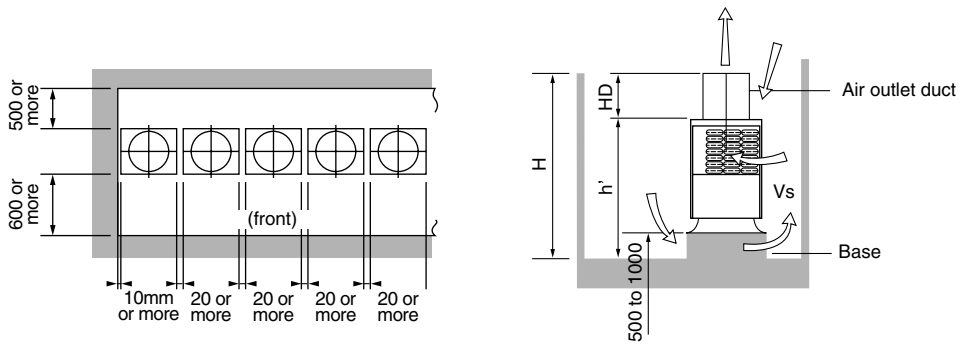
1) When a vent is installed



① The aperture ratio should permit an intake velocity Vs through the vent of 1.5m/s.

② The height of the air outlet duct is HD = H–h.

2) When a vent cannot be installed

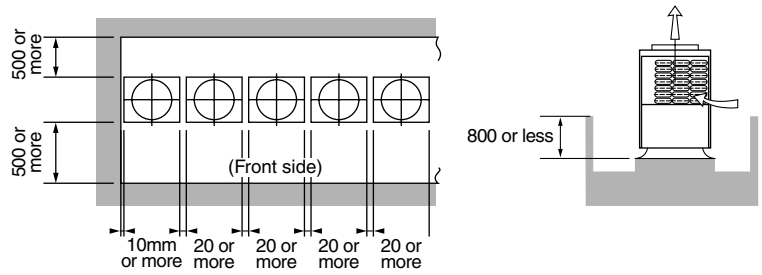


① Install a base so that the height of wall is the same as that of air outlet duct.
(Height for a base is 500 to 1000mm.)

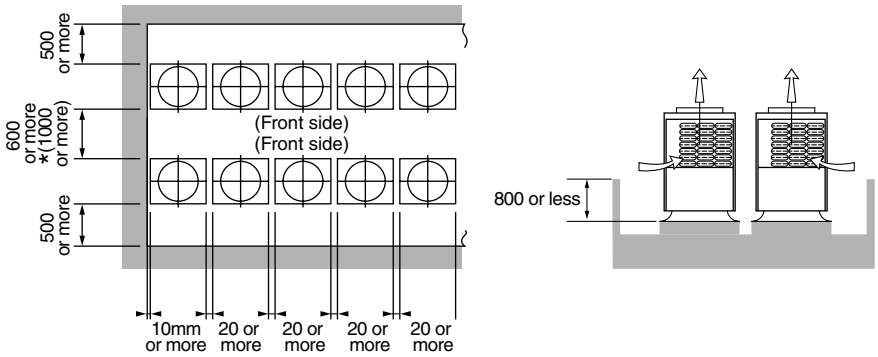
② The height of the air outlet duct is HD = H–h'.

When outer wall is shorter than outdoor units

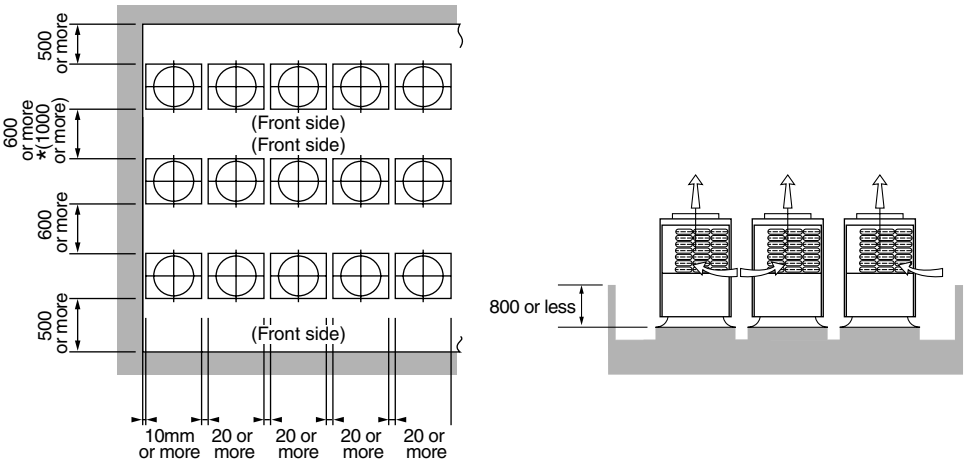
1) One-row installation



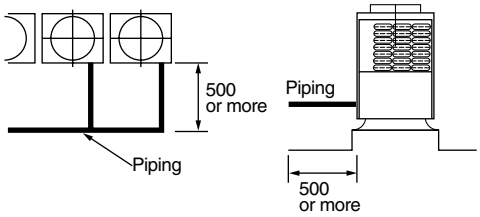
2) Two-row installation



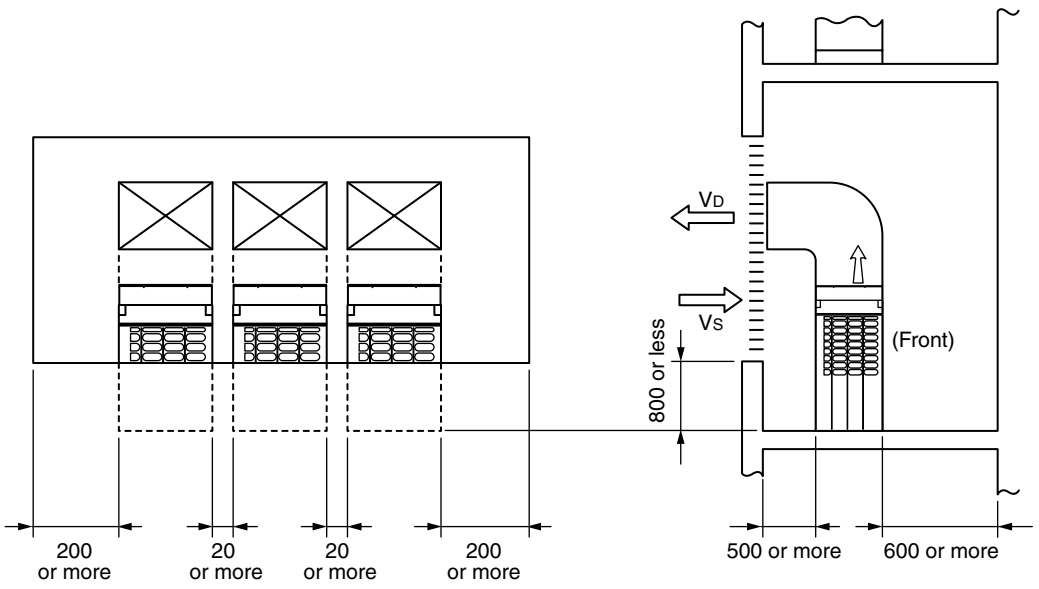
3) Three-row installation



***** These examples assume that the refrigerant lines are routed out the front of the units. (When pipes on the site are run from the outdoor units to the front horizontally, there should be at least 500mm of space between the outdoor units and the horizontal pipes.)



Floor by floor installation



1) Install the air outlet duct for every outdoor unit.
   (When a vent is installed, the air outlet duct should be stuck to the vent.)
2) Flap angle of the vent is 20-degree facing down from the horizontal level.
3) Intake velocity VS through the vent is 1.5m/s. or less.
   Air discharge velocity VD trough the vent is 4 - 5m/s. or less.

[NOTE]

This installation is applied to the case less than 10th floor to avoid the influence of locally strong wind blowing along a street of very tall buildings.

9. ELECTRIC WIRING

⚠ WARNING

Using the exclusive circuit, a person qualified for electrician shall work for the electric work in conformance with the regulations of the local electric company and the Installation Manual.

If there is capacity shortage of the power circuit or incomplete electric work, a fire or electric shock is caused.

For cabling, use the specified cables and connect them securely so that external force of cable does not transmit to the terminal connecting section.

If connection or fixing is incomplete, a fire is caused.

Be sure to connect the earth wire.

Grounding work is necessary based upon a law. If the earth grounding is incomplete, an electric shock is caused.

Do not connect earth wire to gas pipe, lightning rod, or earth wire of telephone.

⚠ CAUTION

Be sure to attach an earth leakage breaker; otherwise an electric shock may be caused.

To Disconnect the Appliance from Main Power Supply.

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.

REQUIREMENT

- Perform wiring of the power supply in conformance with the regulations of the local electric company.
- For wiring of power supply in the indoor unit, refer to the Installation Manual of each indoor unit.
- Never connect the 220–240V power to the terminal block (U1, U2, U3, U4, U5, U6) for control cables. (Trouble is caused.)
- Arrange the cables so that the electric wires do not come to contact with high-temperature part of the pipe; otherwise coating melts and an accident may be caused.
- After connecting cable to the terminal block, take off the trap and then fix the cable with cable clamp.
- Store wiring system for control and refrigerant piping system in the same line.
- Do not turn on power of the indoor unit until vacuuming of the refrigerant pipe will finish.

- For cabling of the power supply of the indoor unit and the inter-unit cabling between indoor and outdoor units, refer to the Installation Manual of indoor unit.

9-1. Power Supply Specifications

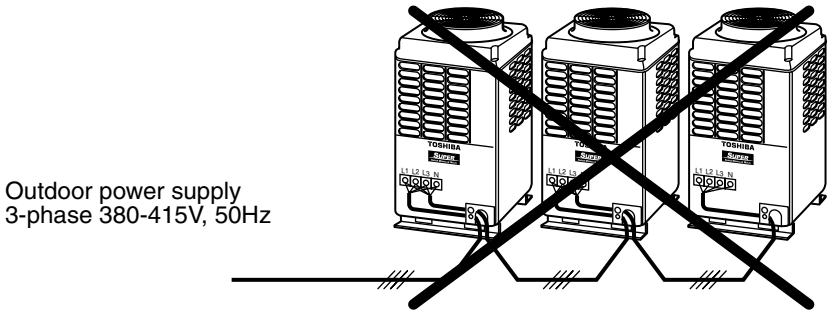
- **Power supply specifications of outdoor unit**

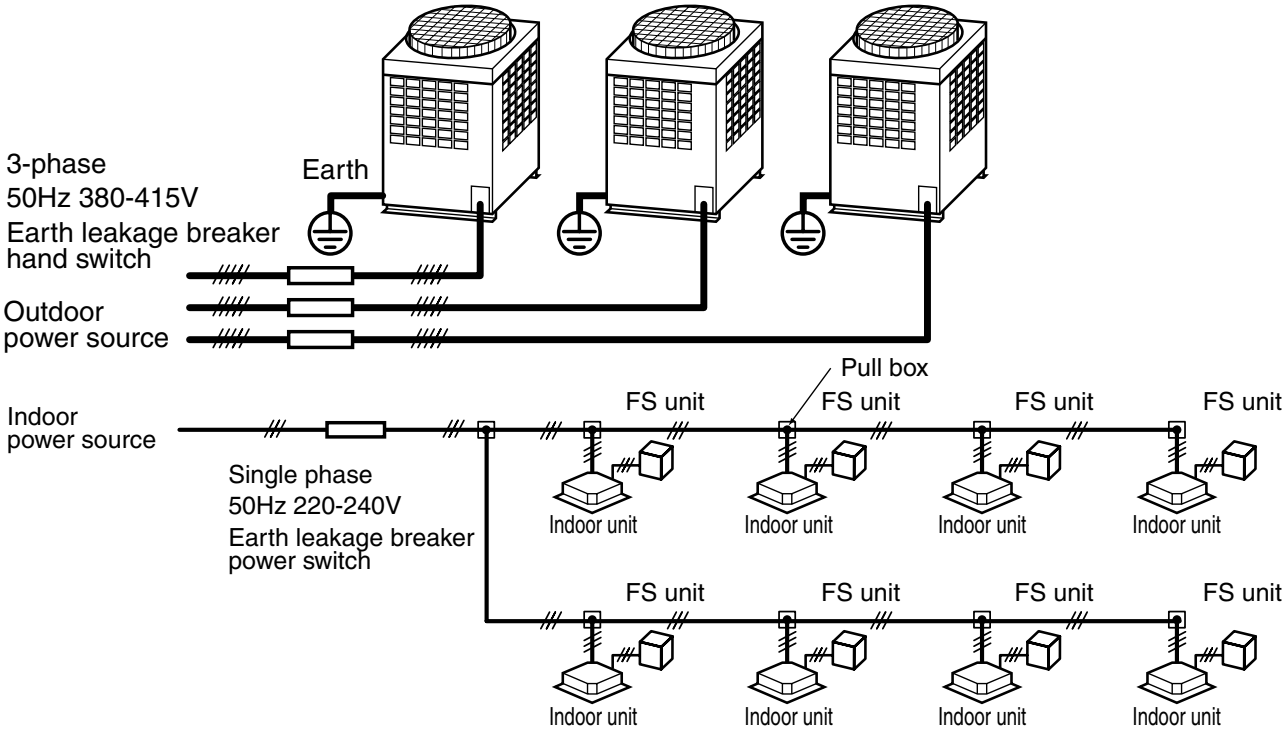
  Select the power supply cabling and fuse of outdoor unit from the following specifications:

  Cable 5-core, in conformance with Design 60245 IEC 66

9-2. Electrical Wiring Design

- Do not connect them via the incorporated terminal block (L1, L2, L3, N).



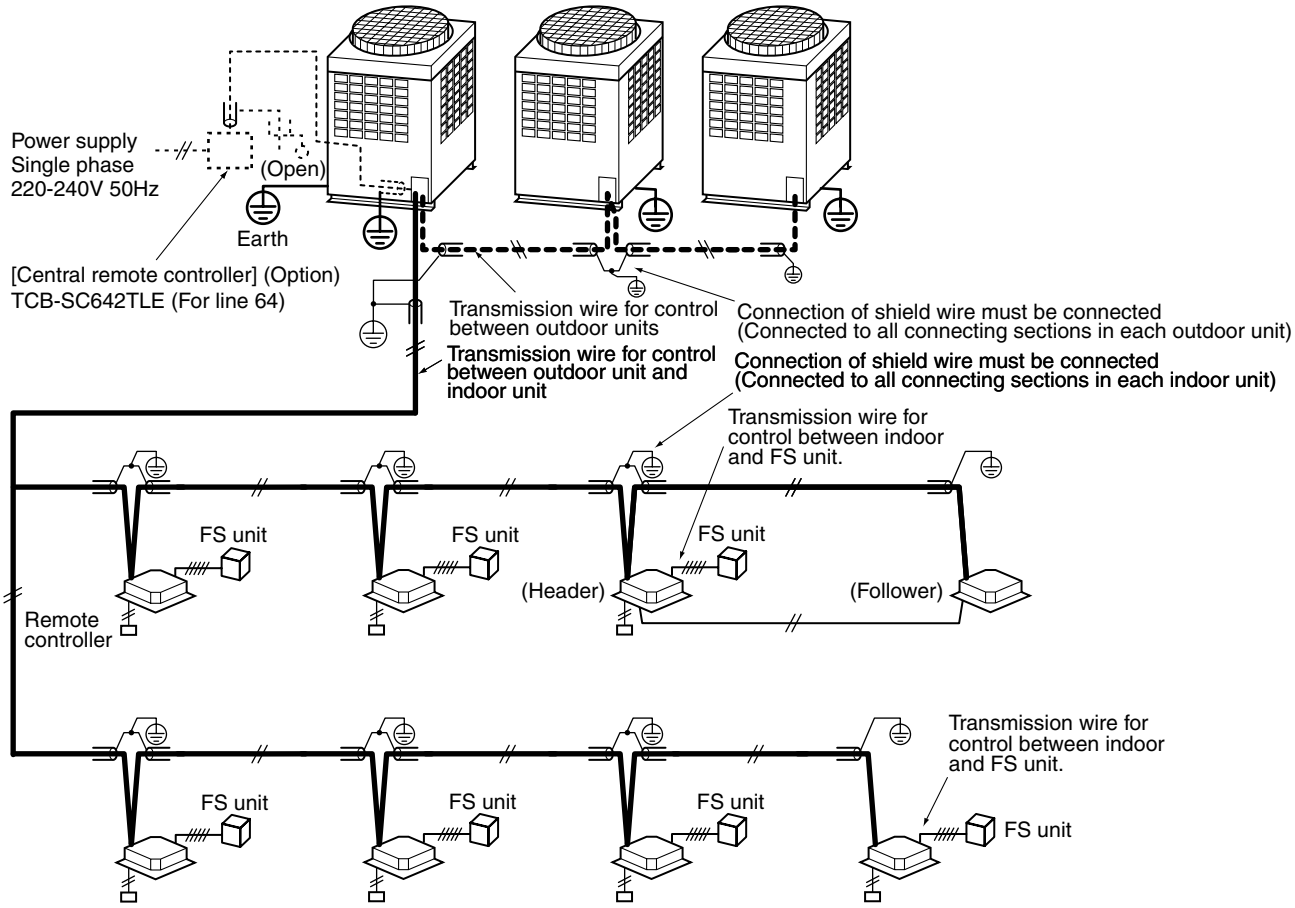


- Unit capacities and power supply wire sizes (Reference)

Model MMY-	Power supply wiring	
	Wire size	Field fuse
MAP0802FT8	3.5 mm² (AWG #10) Max. 20 m	30 A
MAP1002FT8	5.5 mm² (AWG #10) Max. 28 m	30 A
MAP1202FT8	5.5 mm² (AWG #10) Max. 27 m	30 A

- Determine the wire size for indoor unit according to the number of connected indoor units downstream.
- Observe local regulation regarding wire size selection and installation.

9-3. Design of Control Wiring


Power supply
Single phase
220-240V 50Hz
(Open)
Earth
[Central remote controller] (Option)
TCB-SC642TLE (For line 64)
Transmission wire for control between outdoor units
Transmission wire for control between outdoor unit and indoor unit
Connection of shield wire must be connected (Connected to all connecting sections in each outdoor unit)
Connection of shield wire must be connected (Connected to all connecting sections in each indoor unit)
Transmission wire for control between indoor and FS unit.
FS unit
FS unit
FS unit
(Header)
(Follower)
Remote controller
FS unit
FS unit
FS unit
Transmission wire for control between indoor and FS unit.
FS unit

- Wire specification, quantity, size of crossover wiring and remote controller wiring

Name	Q'ty	Size			Specification
		Up to 500m	Up to 1000m	1000 to 2000m	
Crossover wiring (indoor-indoor / indoor-outdoor / control wiring, central control wiring)	2 cores	1.25mm²		2.0mm²	Shield wire
Remote controller wiring	2 cores	0.5 to 2.0mm²	—	—	—
Control wiring between indoor and FS unit	Be sure to use the attached connection cable (6m). If the length between indoor and FS unit exceeds 5 m, connect by using the connection cable kit (RBC-CBK15FE). (Sold separately)				

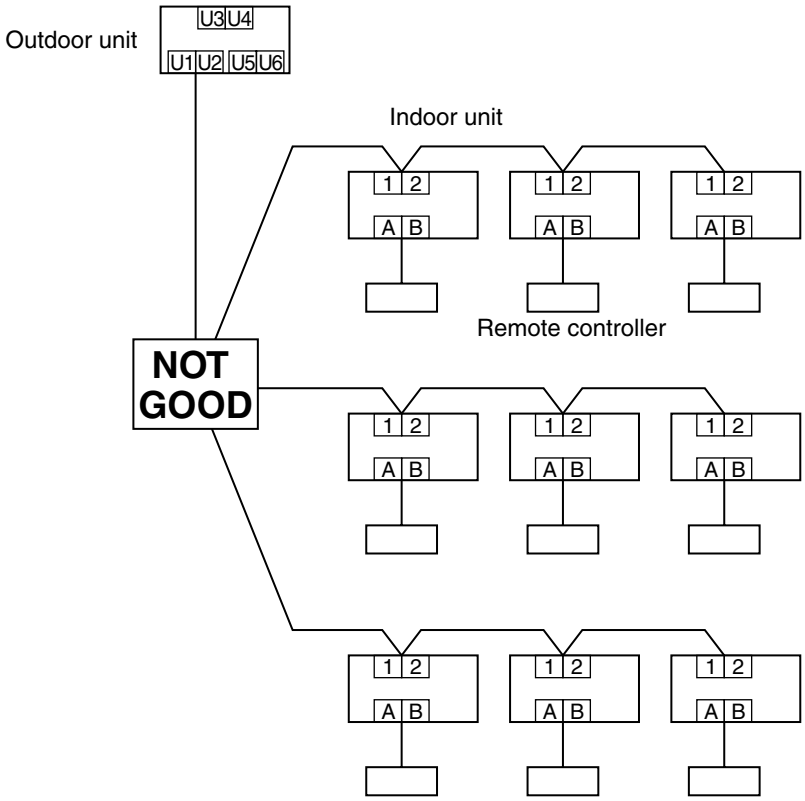
(1) The crossover wiring and central control wiring use 2-core non-polarity transmission wires. Use 2-core shield wires to prevent noise trouble. In this case, close (connect) the end of shield wires, and perform the functional grounding for the end of the shield wires which are connected to both indoor and outdoor units. For the shield wires which are connected between the central remote controller and the outdoor unit, perform the functional grounding at only one end of central control wiring.

(2) Use 2-core and non-polarity wire for remote controller. (A, B terminals)

Use 2-core and non-polarity wire for wiring of group control. (A, B terminals)

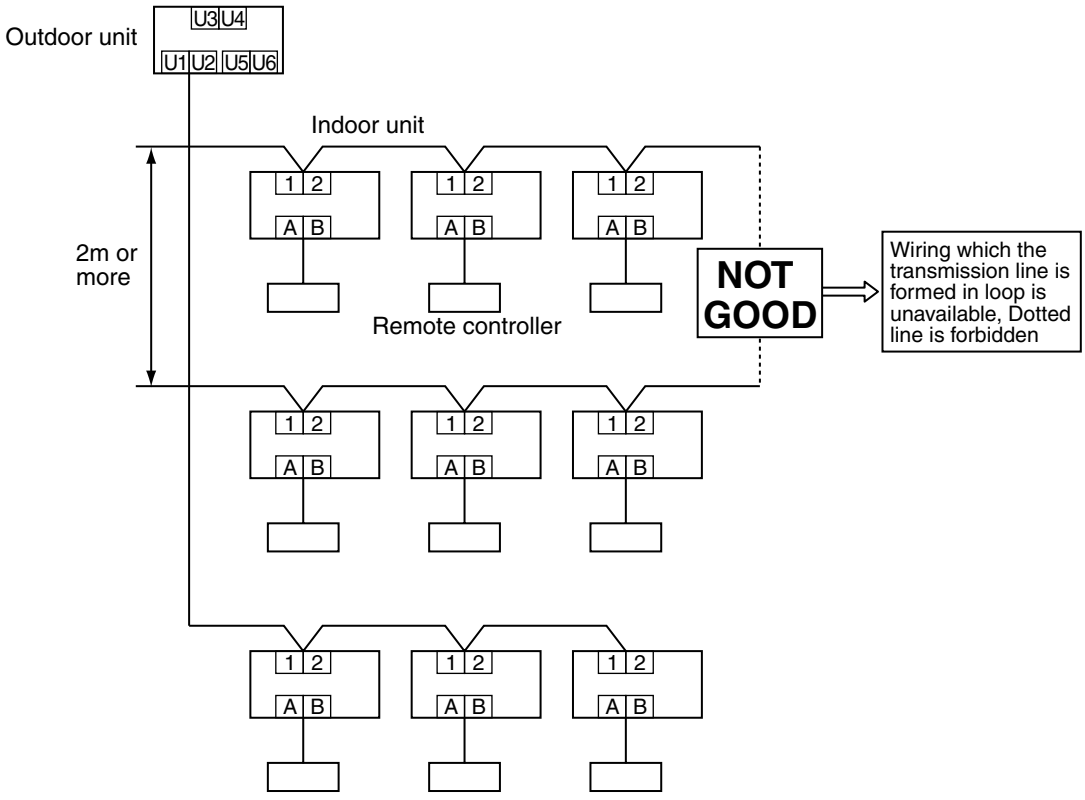
NOTE

4 or more control wires connected to one terminal is prohibited.



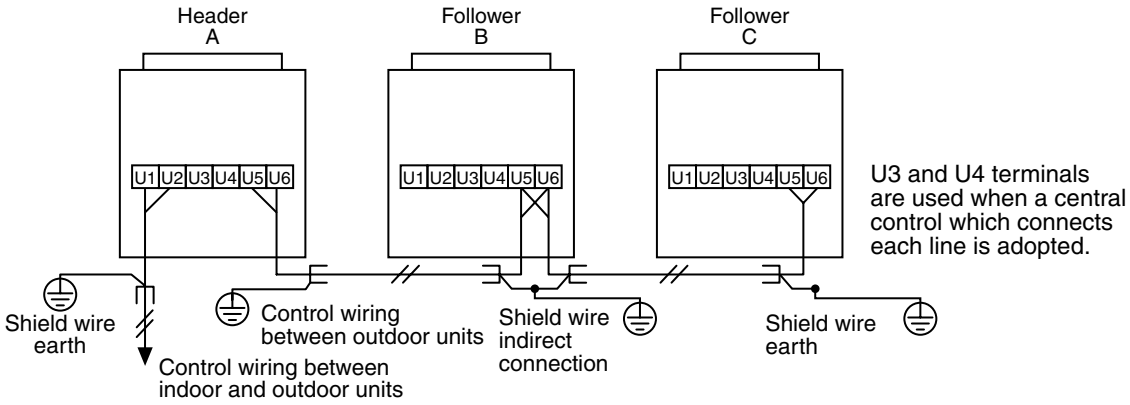
NOTE

Loop wiring of control wires is prohibited.



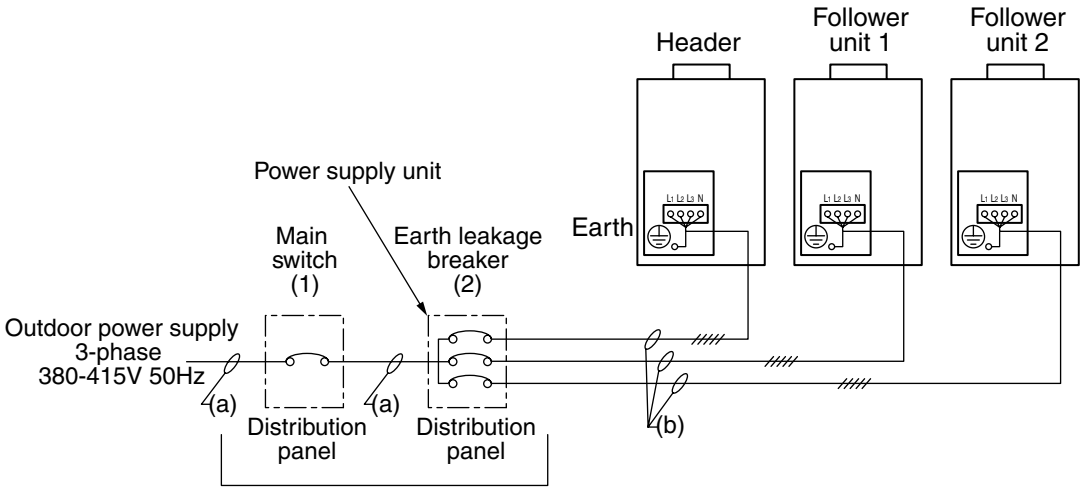
- **Specifications of cables for controlling**

1. Connect each cable for controlling as shown below.



- **Power supply specifications of combined outdoor units**

When a distribution panel is provided for each combined outdoor units as shown in the following figure, select the power supply wiring of the main trunk line (a) up to the distribution panel and fuse from the table below.



Heat Recovery model	Power supply wiring	
	Wire size	Field fuse
MMY-AP1602FT8	14 mm² (AWG #6) Max. 39 m	50 A
MMY-AP1802FT8	14 mm² (AWG #6) Max. 37 m	50 A
MMY-AP2002FT8	14 mm² (AWG #6) Max. 35 m	60 A
MMY-AP2402FT8	22 mm² (AWG #4) Max. 41 m	75 A
MMY-AP2602FT8	22 mm² (AWG #4) Max. 40 m	75 A
MMY-AP2802FT8	38 mm² (AWG #4) Max. 66 m	75 A
MMY-AP3002FT8	38 mm² (AWG #1) Max. 64 m	100 A

*** :** Model name differs according to each wire manufacturer.

■ Single outdoor unit

50Hz

Heat pump Model MMY-	Nominal voltage (V-Ph-Hz)	Voltage range		Compressor		Fan motor		Power supply		
		Min	Max	RLA	LRA	kW	FLA	MCA	MOCP	ICF
MAP0802FT8	400-3-50	342	457	5.2 + 5.2	—	0.60	1.0	20.0	30	—
MAP1002FT8	400-3-50	342	457	6.5 + 6.5	—	0.60	1.1	22.5	30	—
MAP1202FT8	400-3-50	342	457	9.5 + 9.5	—	0.60	1.1	24.5	30	—

■ Combination of outdoor unit

Heat pump Model MMY-	Nominal voltage (V-Ph-Hz)	Voltage range		Compressor						Fan motor		Power supply		
				Unit No.1		Unit No.2		Unit No.3						
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	kW	FLA	MCA	MOCP	ICF
AP1602FT8	400-3-50	342	457	5.2 + 5.2	—	5.2 + 5.2	—	—	—	0.60 × 2	1.0 + 1.0	40.0	50	—
AP1802FT8	400-3-50	342	457	6.5 + 6.5	—	5.2 + 5.2	—	—	—	0.60 × 2	1.1 + 1.0	42.5	50	—
AP2002FT8	400-3-50	342	457	6.5 + 6.5	—	6.5 + 6.5	—	—	—	0.60 × 2	1.1 + 1.1	45.0	60	—
AP2402FT8	400-3-50	342	457	5.2 + 5.2	—	5.2 + 5.2	—	5.2 + 5.2	—	0.60 × 3	1.0 + 1.0 + 1.0	60.0	70	—
AP2602FT8	400-3-50	342	457	6.5 + 6.5	—	5.2 + 5.2	—	5.2 + 5.2	—	0.60 × 3	1.1 + 1.0 + 1.0	62.5	70	—
AP2802FT8	400-3-50	342	457	6.5 + 6.5	—	6.5 + 6.5	—	5.2 + 5.2	—	0.60 × 3	1.1 + 1.1 + 1.0	65.0	80	—
AP3002FT8	400-3-50	342	457	6.5 + 6.5	—	6.5 + 6.5	—	6.5 + 6.5	—	0.60 × 3	1.1 + 1.1 + 1.1	67.5	80	—

Legend
MCA : Minimum Circuit Amps
MOCP : Maximum Overcurrent Protection (Amps)
ICF : Maximum Instantaneous Current Flow Start
RLA : Rated Load Amps
LRA : Locked Rotor Amps
FLA : Full Load Amps
kW : Fan Motor Rated Output (kW)

NOTE :
RLA is based on the following conditions.
Indoor temperature : 27°C DB/19°C WB
Outdoor temperature : 35°C DB

9-4. For Indoor Unit Power Supply (The outdoor unit has a separate power supply.)

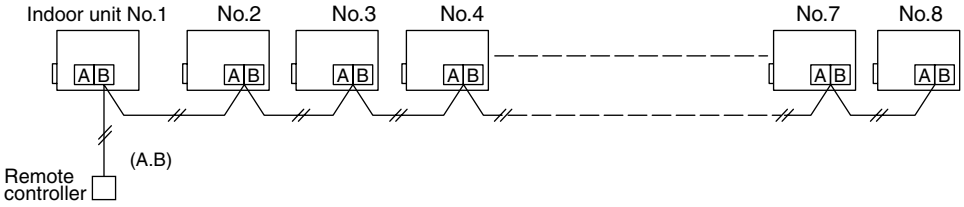
Item / Model	Power supply wiring		
	Wire size		Field fuse
All models of indoor units	2.0mm² (AWG#14) Max. 20m	3.5mm² (AWG#12) Max. 50m	15A
FS unit	Be sure to use the attached cable (6m). If the length between indoor and FS unit exceeds 5m, connect by using the connection cable kit (RBC-CBK15FE). (Sold separately)		

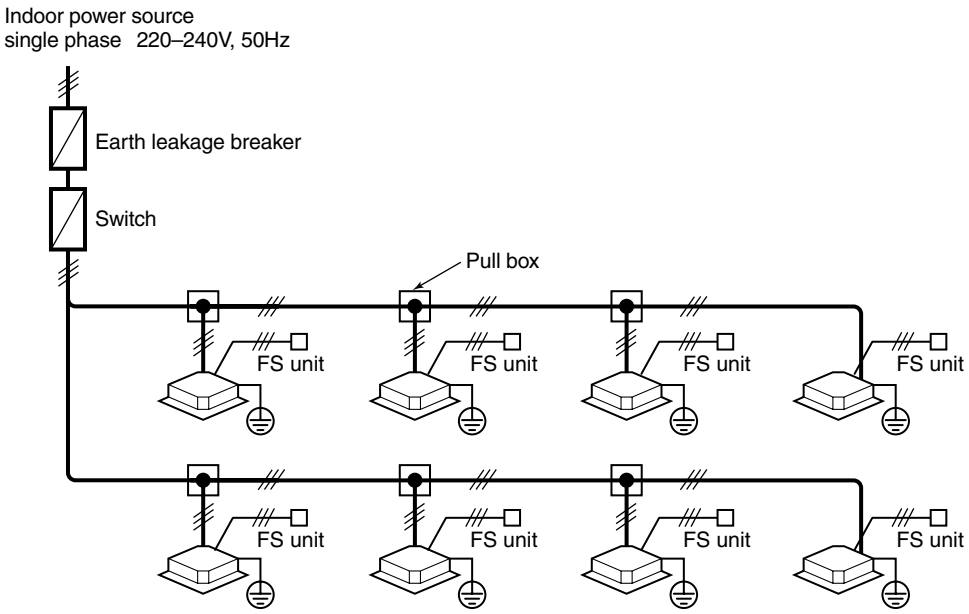
NOTE :

The connecting length indicated in the table represents the length from the pull box to the outdoor unit when the indoor units are connected in parallel for power, as shown in the illustration below. A voltage drop of no more than 2% is also assumed. If the connecting length will exceed the length indicated in the table, select the wire thickness in accordance with indoor wiring standards.

- **Group Control through a Remote Controller**

  Group control of multiple indoor units (8 units) through a single remote controller switch



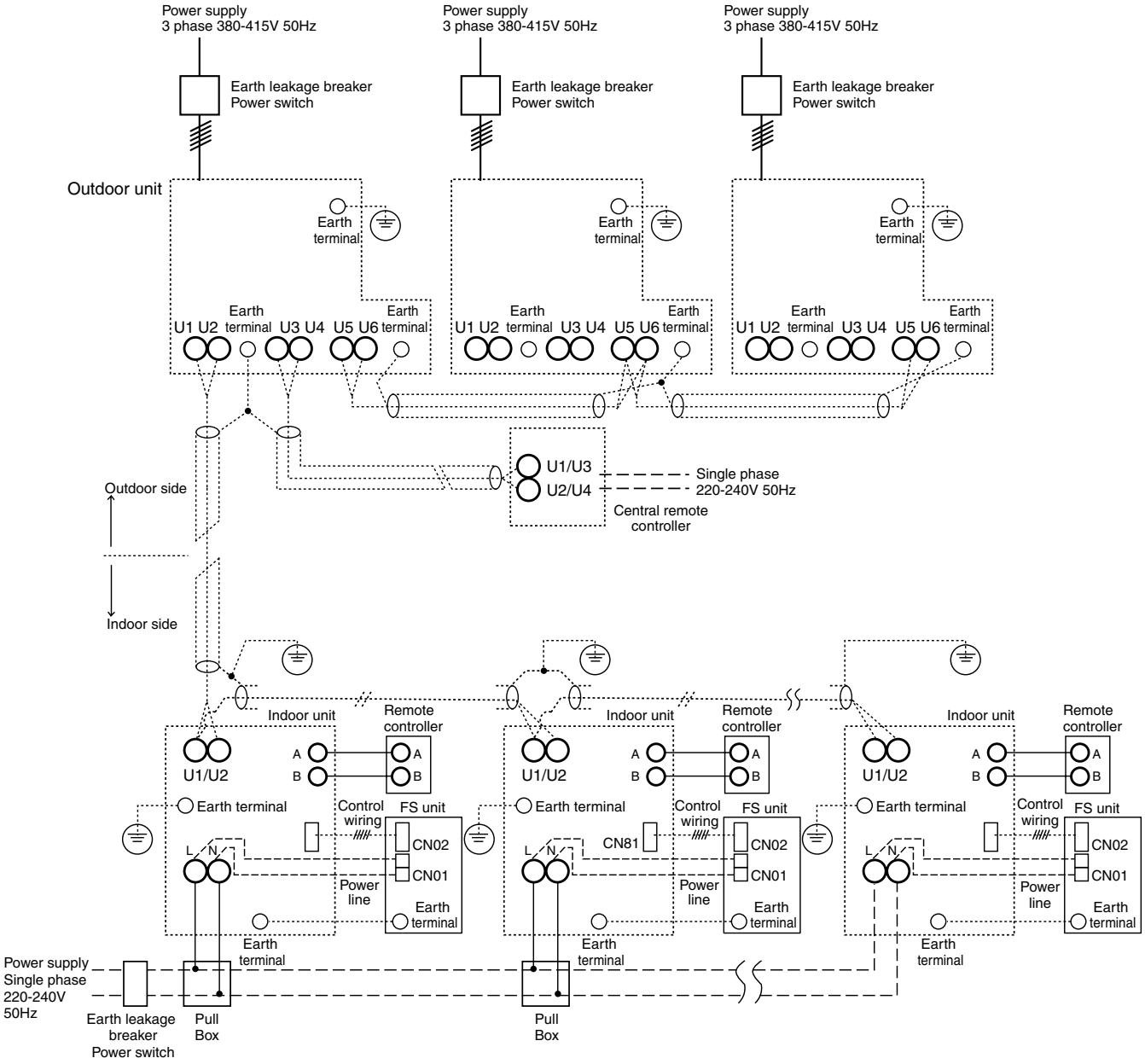


⚠ CAUTION

(1) Keep the refrigerant piping system and the indoor-indoor/indoor-outdoor control wiring systems together.

(2) When running power wires and control wires parallel to each other, either run them through separate conduits, or maintain a suitable distance between them.
(Current capacity of power wires: 10A or less for 300mm, 50A or less for 500mm)

9-5. System Wiring Diagram



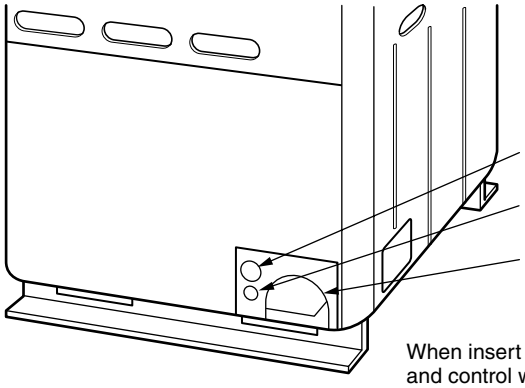
NOTE :

Control wire and power line wire between FS unit and indoor unit are the accessary parts of FS unit. (Wire length : 6m)

If the length between indoor and FS unit exceeds 5m, connect by using the connection cable kit sold separately (RBC-CBK15FE).

9-6. Connection of Power Supply Cable with Control Wire

Insert power supply cable and control wire after removing knockout of the piping/wiring panel at front side of the outdoor unit.



When insert power supply cable
and control wire, protect power supply cable
and control wire from edge after removing knockout.

■ Power supply cable

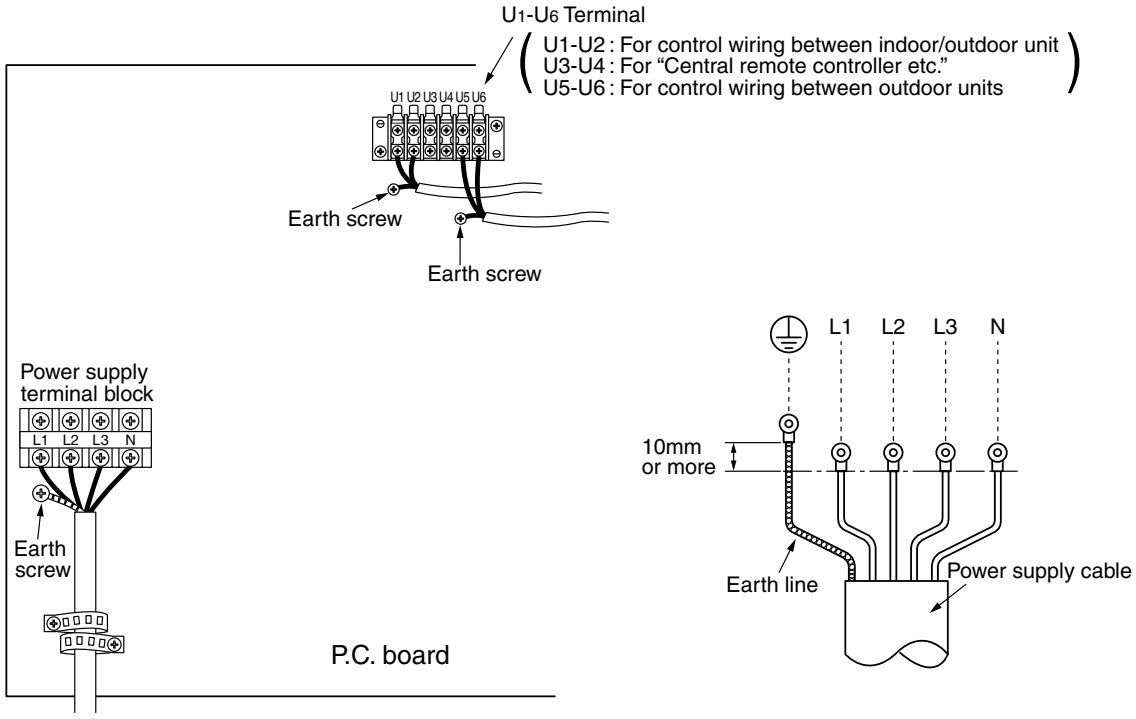
1. Connect the power supply cables and earthing wire to the terminal block of the power supply through a notched section at side of the electric parts box, and fix with a clamp.
2. Bundle the power supply cables using the hole so that they are not out of the notched section of the electric parts box.

■ Control wire

1. Connect the control wire between indoor and outdoor units and the control wire between outdoor units to (U1, U2, U5, U6) terminal section through a hole at side of the electric parts box, and fix with a clamp.
2. Use the control wire with 2-core shield wire (1.25mm² or more) in order to prevent noise trouble. (Non-polarity)

NOTE :

1) Be sure to separate the power supply cables and each control cable.
2) Arrange the power supply cables and each control cable so that they do not contact with the bottom surface of the outdoor unit.
3) A terminal block (U3, U4 terminal blocks) for connecting an optional part “Central remote controller etc.” is provided on the inverter unit, so be careful to miswiring.



9-7. Electrical Wiring of Flow Selector Unit

Wire connections **Use the supplied, dedicated wires.**

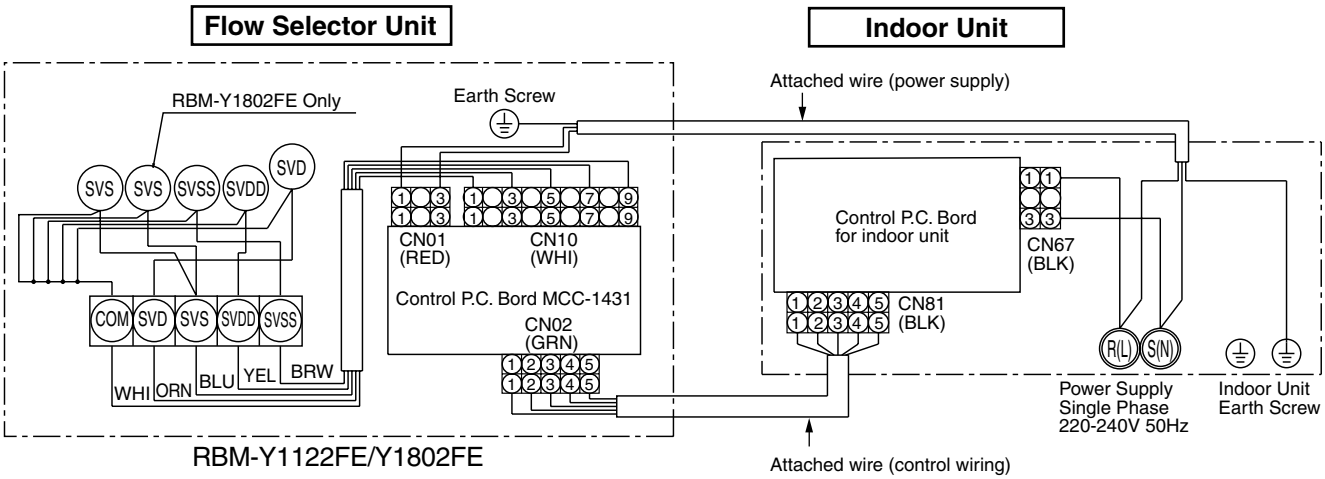
REQUIREMENT

- Check that power is not supplied to the indoor unit before connecting wires.
- For safety, connect wires to the Flow Selector unit first.
- Be sure to put wires through the wire connecting ports on the Flow Selector unit and the indoor unit.

Connection diagram

- Power is supplied from the connected indoor unit.
- Connect the attached wires (power supply / control wiring) between the Flow Selector unit and the indoor unit.

Connect wires as shown in the below figure.

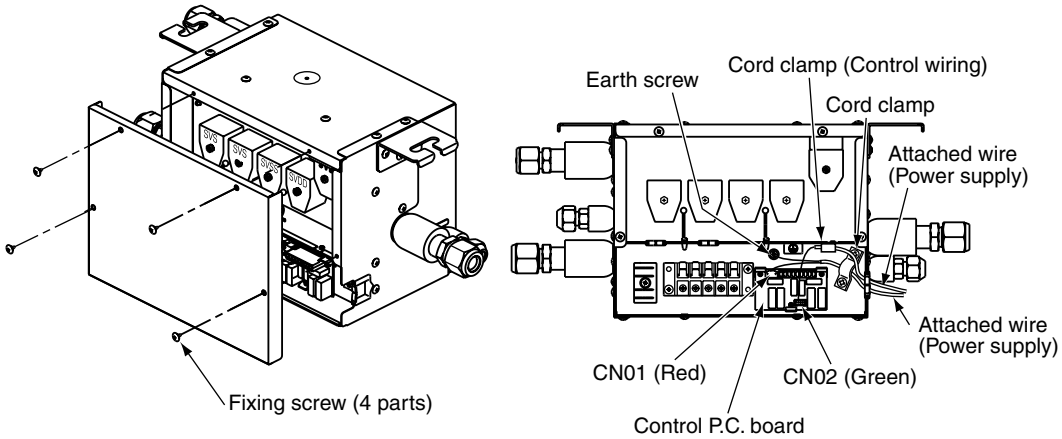


RBM-Y1122FE/Y1802FE

Attached connection wire between indoor and FS unit can be used up to 5m in pipe length between indoor and FS unit. When the pipe length between indoor and FS unit exceeds 5m, be sure to use the connection cable kit sold separately (RBC-CBK15FE).

Flow Selector unit

- Remove the fixing screws (4 parts) from the cover of the Flow Selector unit.
- Connect the connector (red) of the attached wire (power supply) to CN01 on the FS unit control P.C. board.
- Connect the ring terminal of the attached wire (power supply) to the earth screw.
- Connect the connector (green) of the attached wire (control wiring) to CN02 on the FS unit control P.C. board.
- Secure the two attached wires with the attached cord clamp.
  (Be careful not to apply tension to the wires and connectors.)
- Check that the wires are not pinched, and then attach the cover.



Indoor unit

See also the Installation Manual supplied with the indoor unit.

- Remove the electrical parts box cover from the indoor unit.
- Connect the receptacle R(L) and S(N) on the attached wire (power supply) to a free on the R(L) and S(N) terminal block for power supply.

  ∗ When the indoor unit is the high wall or concealed duct high static pressure type, connect as follows.

  Connect the wire to the lead wires with wire joint on the R(L) and S(N) terminal block for power supply, using the following procedure:

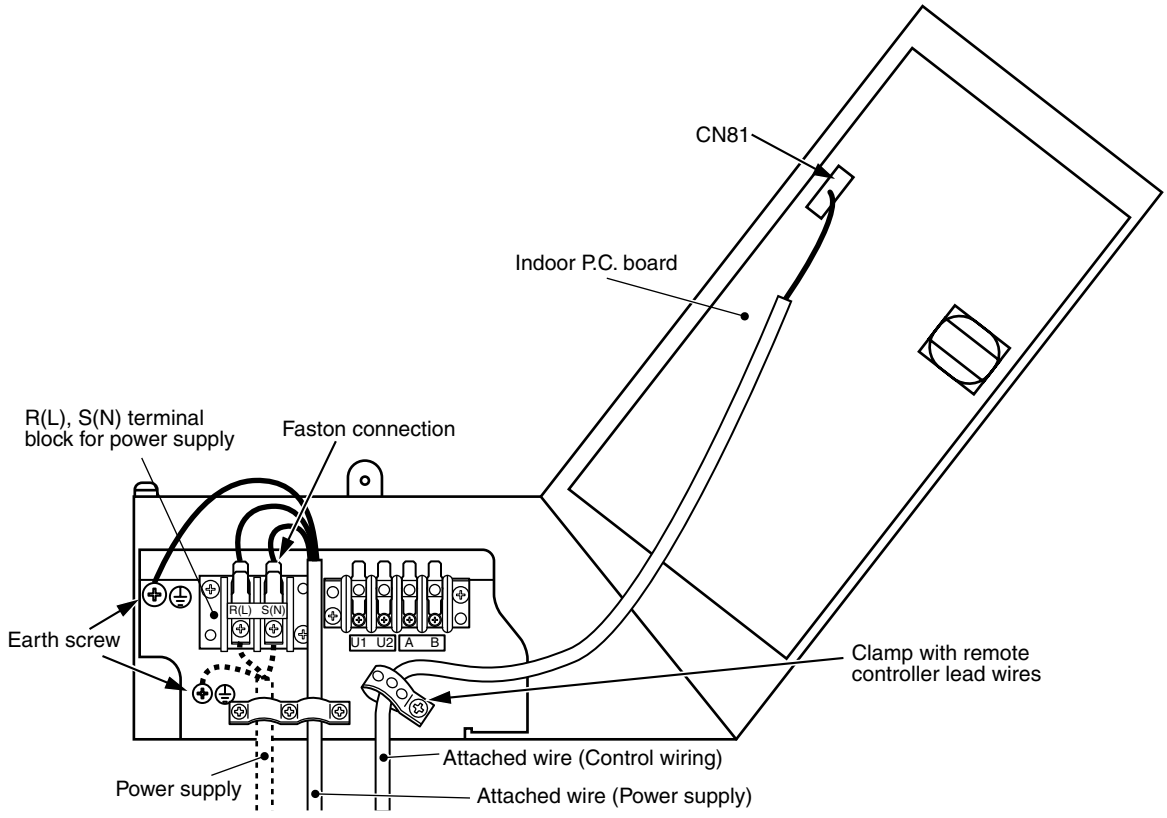
  Cut the wire joint on each lead wire, and cut the receptacle R(L) and S(N) on the attached wire (power supply). Then check the R(L) and S(N) phases, and connect the wire and the lead wires with the attached wire joints.

- Connect the ring terminal of the attached wire (power supply) to the earth screw.
- Connect the connector (black) of the attached wire (control wiring) to CN081 on the Indoor P.C. board.
- Secure the two attached wires with the attached cord clamp.

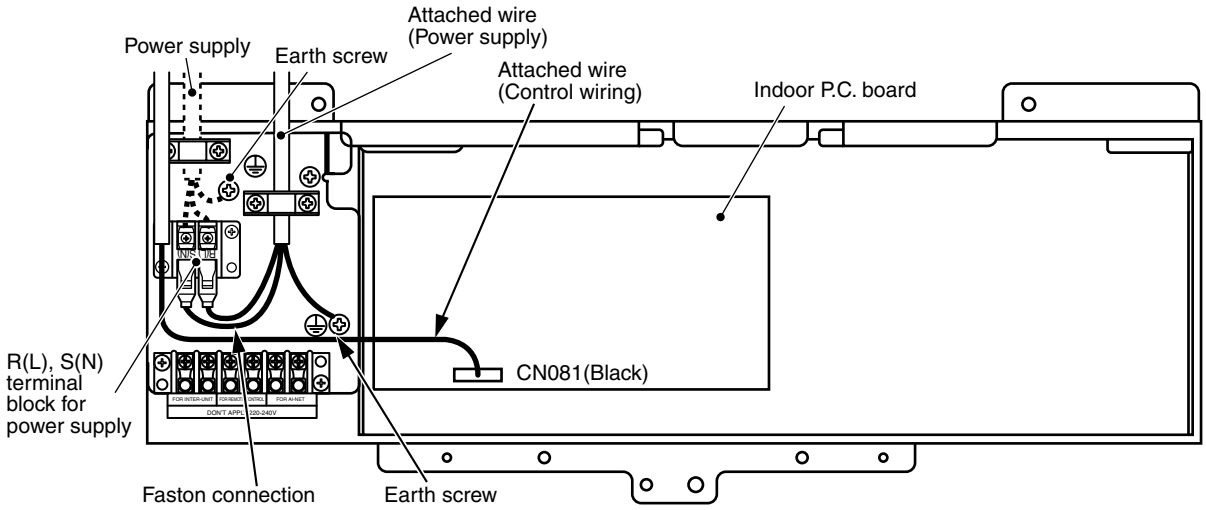
  (Be careful not to apply tension to the wires and connectors.)
- Check that the wires are not pinched, and then attach the cover.

■ Connections

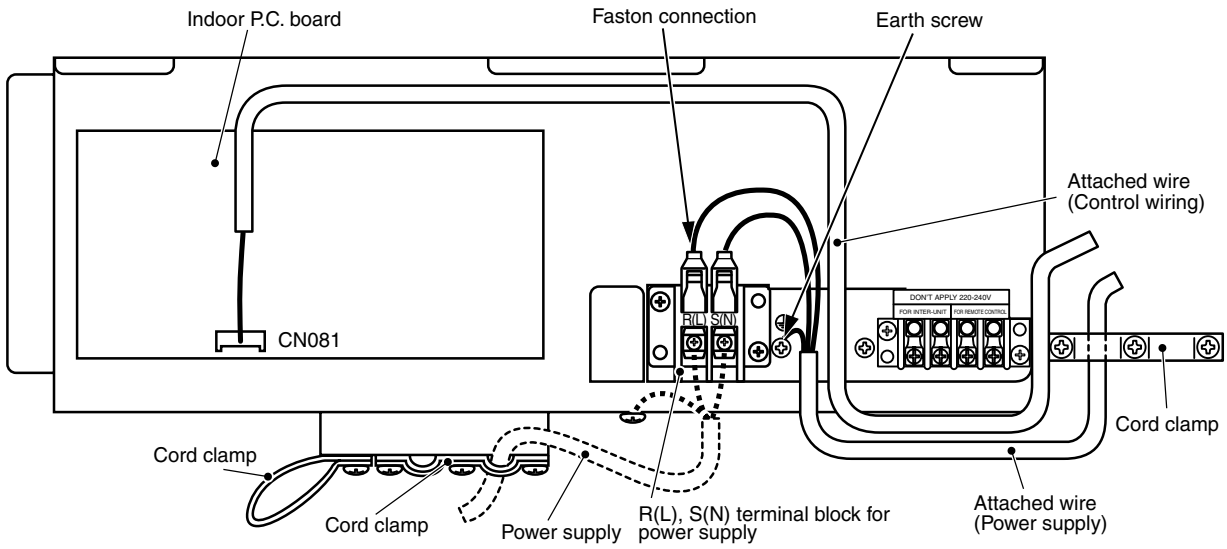
4-way Air Discharge Cassette Type (MMU-AP✻✻1H Series)



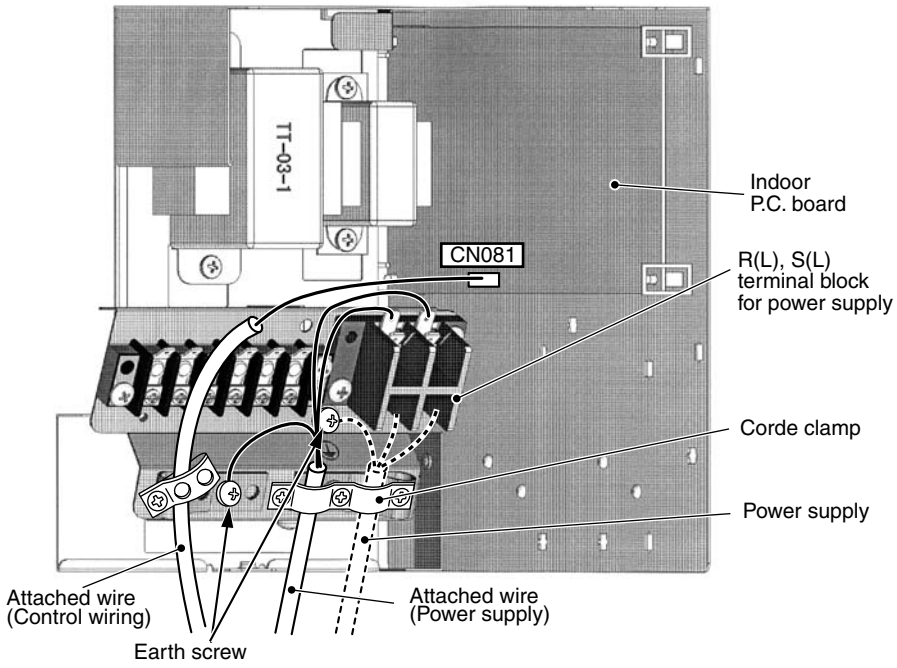
2-way Air Discharge Cassette Type (MMU-AP**1WH Series)



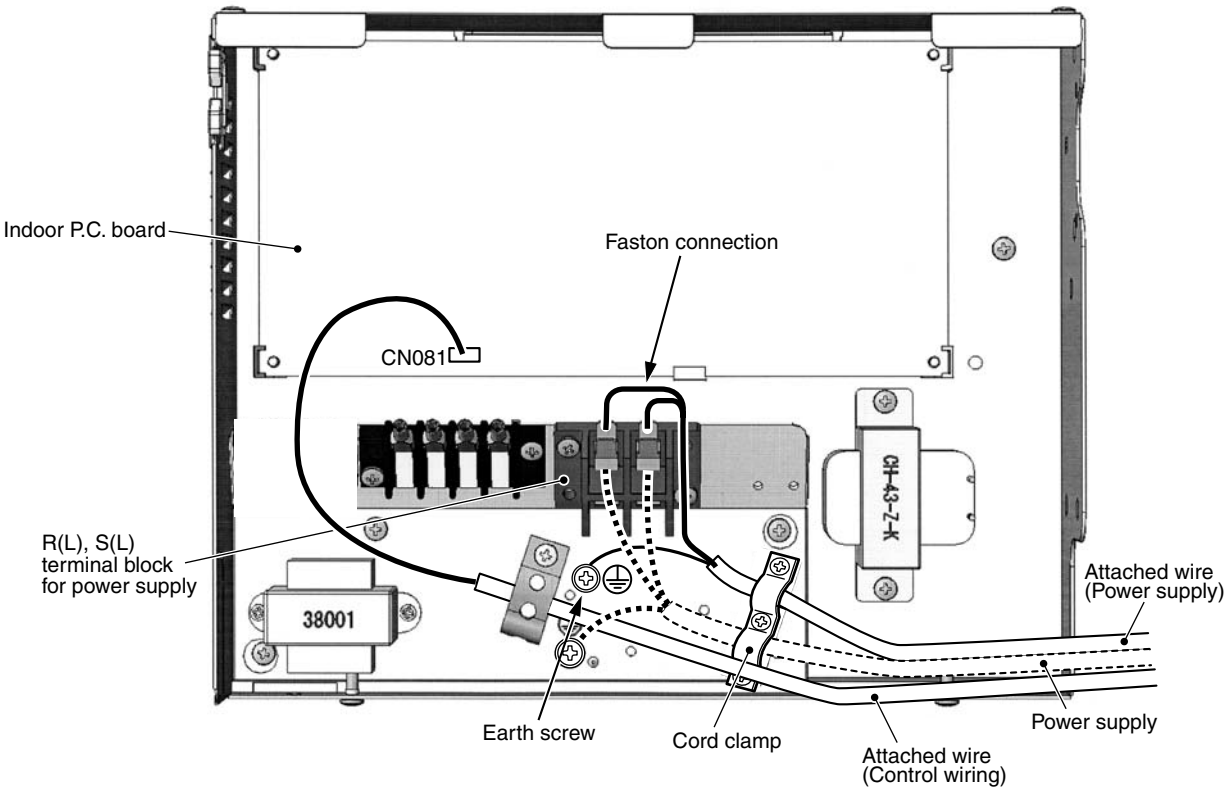
1-way Air Discharge Cassette Type (MMU-AP**1SH Series)
Floor Standing Type (MMF-AP**1H Series)



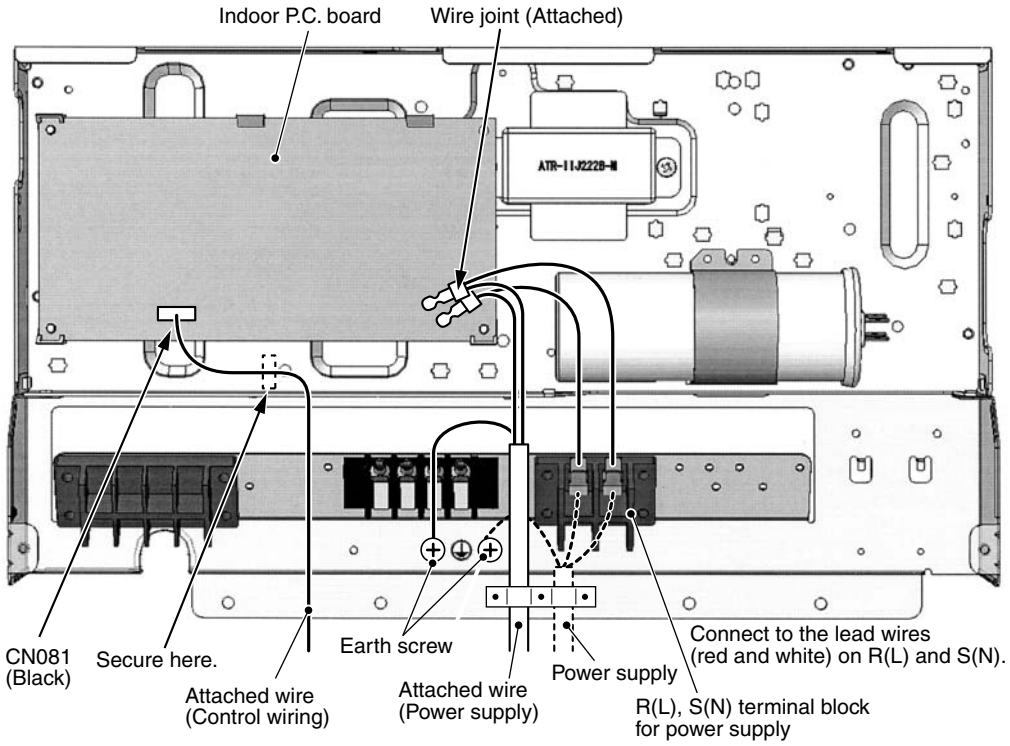
1-way Air Discharge Cassette Type (MMU-AP**1YH Series)



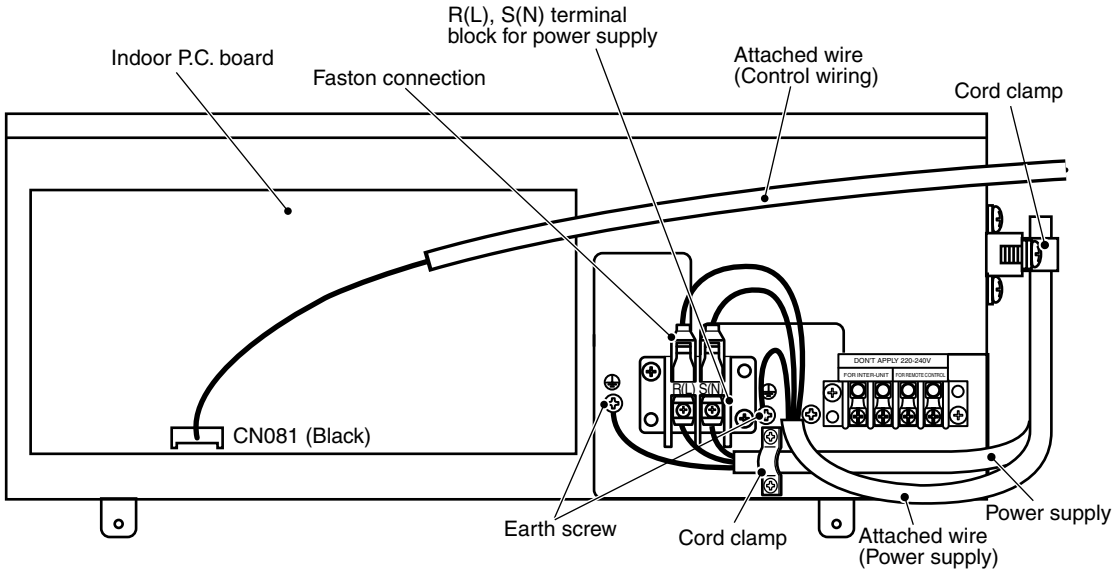
Concealed Duct Standard Type (MMD-AP**1BH Series)



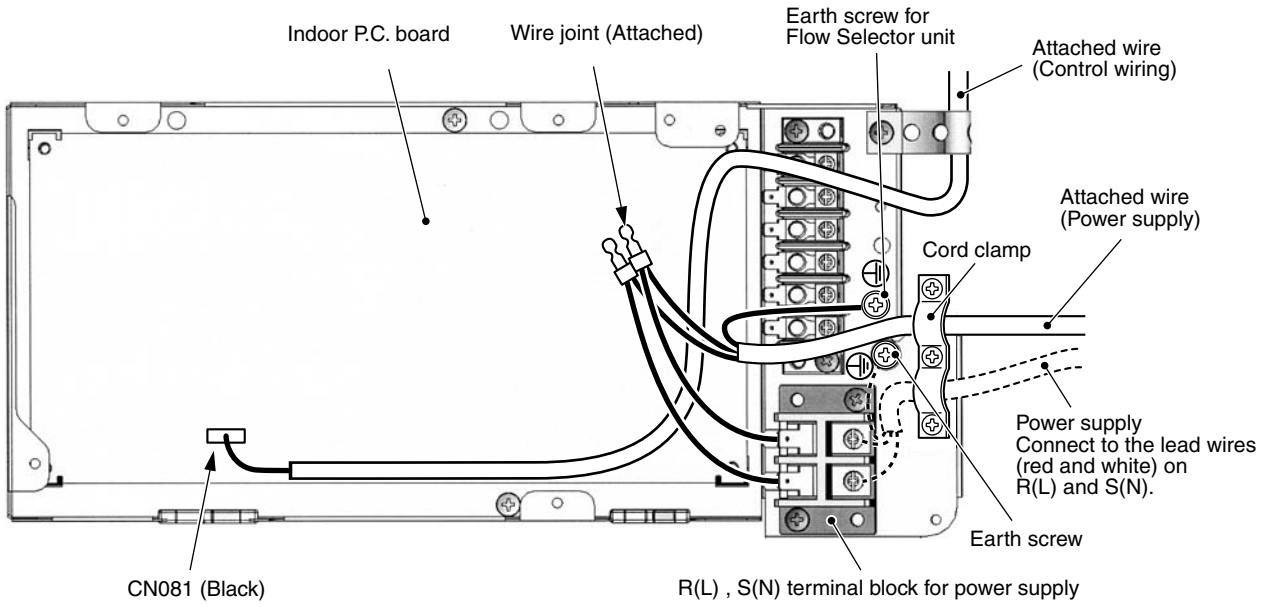
Concealed Duct High Static Pressure Type (MMD-AP**1H Series)



Under Ceiling Type (MMC-AP**1H Series)



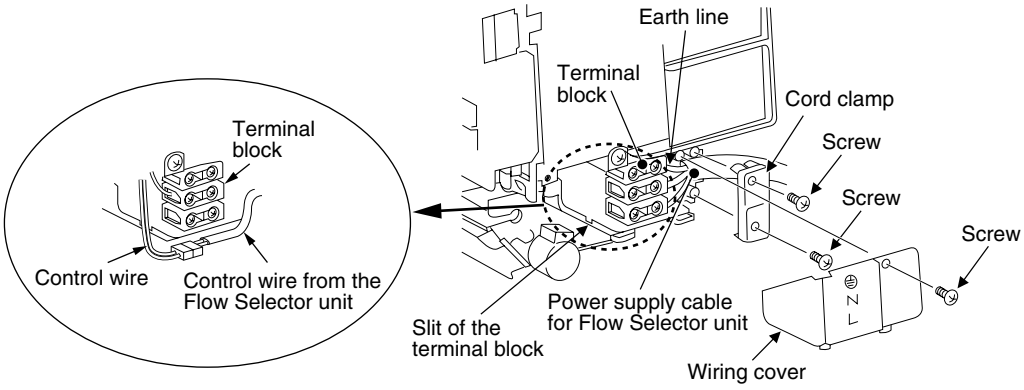
High Wall Type (MMK-AP**1H Series)



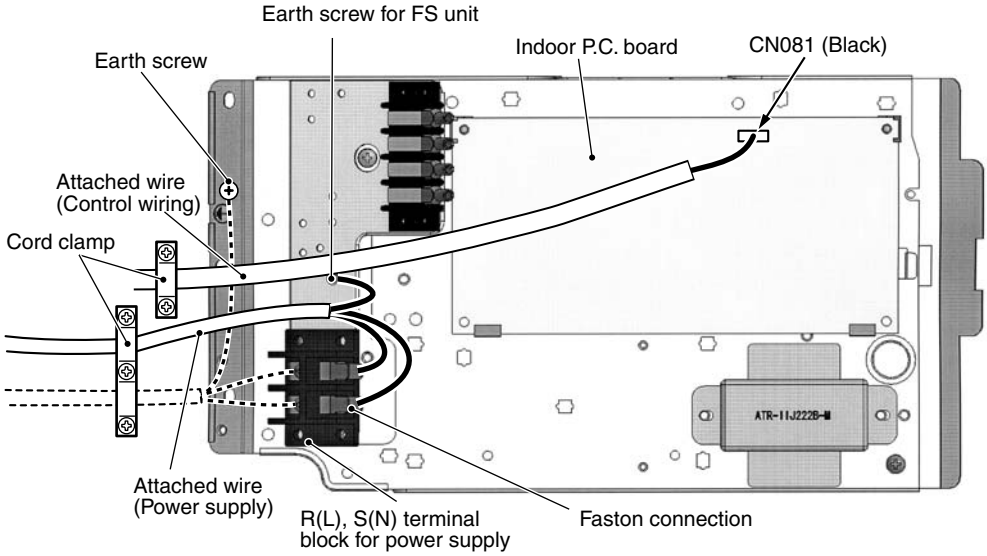
High Wall Type (MMK-AP**2H Series)

For the Flow Selector unit that have power supply cord, connect a power supply cable to it as mentioned below.

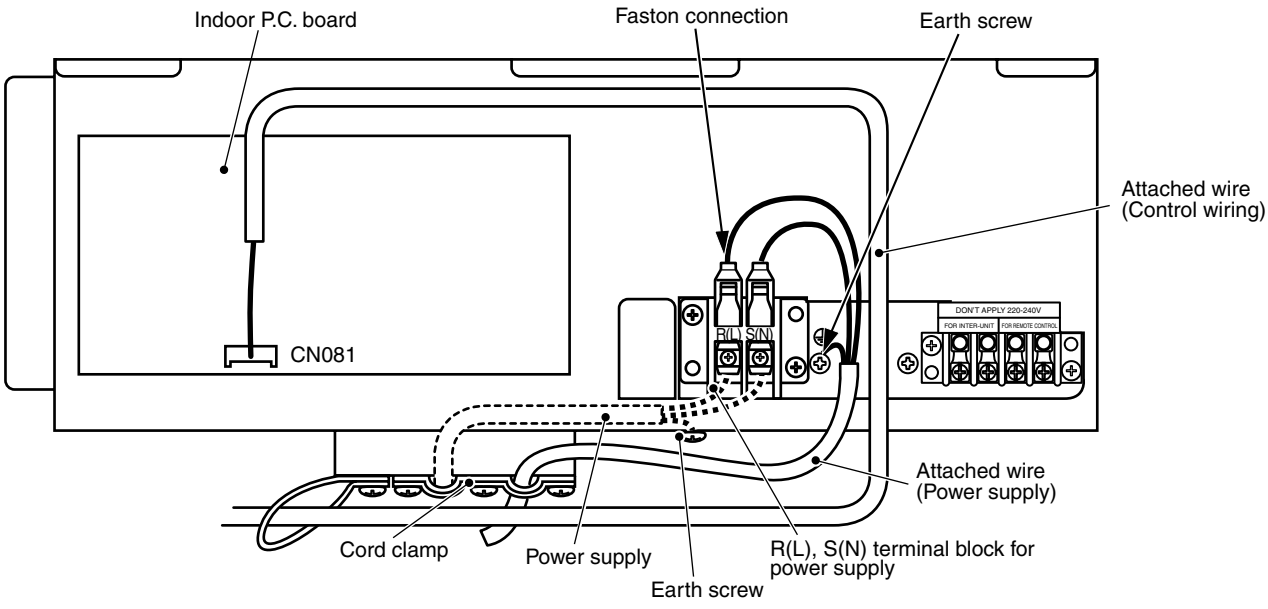
1. Open the air inlet grille upward.
2. Remove the four screws securing the front panel.
3. Slightly open the lower part of the front panel then pull the upper part of the front panel toward you to remove it from the rear plate.
4. After removing the front panel, remove the wiring cover and the cord clamp.
5. Connect and secure the power supply cable of Flow Selector unit and secure the cord clamp.
6. The control wires are included in terminal block part of the power supply.
   Take out the control wires outwards through the slit of the terminal block.
7. Fasten the wiring cover surely with screws.
8. Connect the control wire taken out through the slit on the terminal block and the control wire from the Flow Selector unit at the relay terminal section.



Floor Standing Cabinet Type (MML-AP**1H Series)



Floor Standing Concealed Type (MML-AP**1BH Series)



10. INDOOR UNIT TERMINAL BOARD PLACEMENT AND WIRING

■ 4-way air discharge cassette type

Wiring the indoor unit

Be sure to connect wires matching the terminal numbers. Incorrect connection causes a trouble.

Treating of wire connecting port

Using the attached heat insulator, seal the wire connecting ports. Otherwise, a dewing may be caused.

Wiring of remote controller cord

A low-voltage circuit is used for the circuit of the remote controller.

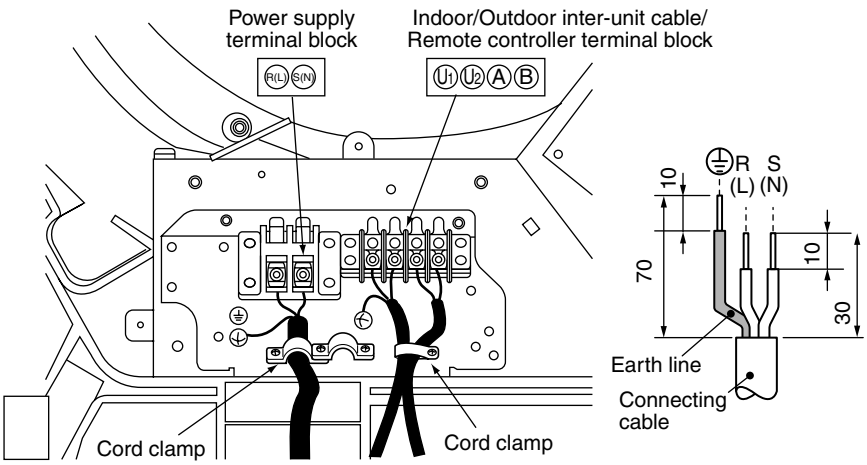
It cannot be come to directly contact with wires of AC 220–415V for 50Hz, or also cannot be stored in the same conduit tube.

- For the remote controller cord, 2-core vinyl cab tire round cord (0.3mm²) can be used up to total length 200m, and the other (0.75mm²) can be used up to total length 500m.
- Connect wires matching symbols of the remote controller with A, B terminals of the terminal block. Never connect AC 220–240V, 380–415V for 50Hz power source. If doing so, a trouble is caused.

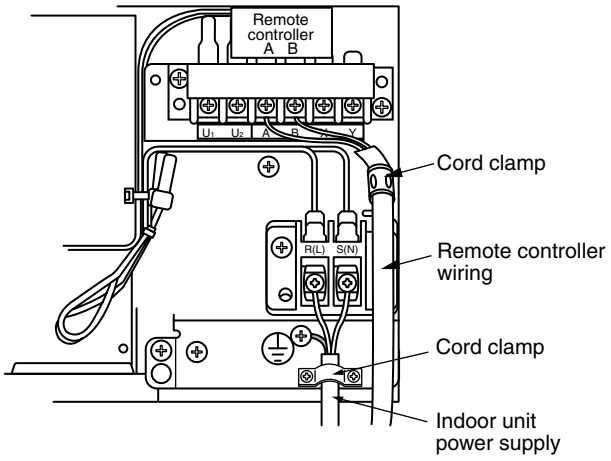
Wiring of ceiling panel

Mounting of the ceiling panel with auto louver

Following the Installation Manual for the ceiling panel, connect the connector (2P : Red) which is out of the ceiling panel in the electric parts box.



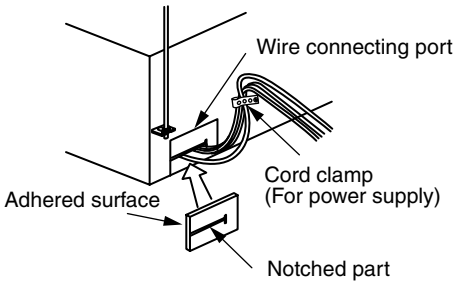
■ 2-way air discharge cassette type



Treating of wiring connecting port

Using the attached heat insulator, seal the connecting port of wiring. If sealing is not executed, dewing may be caused.

- As shown in the figure, seal the wire connecting port with attached heat insulator. If sealing is insufficient, dewing is caused in the electric parts box.

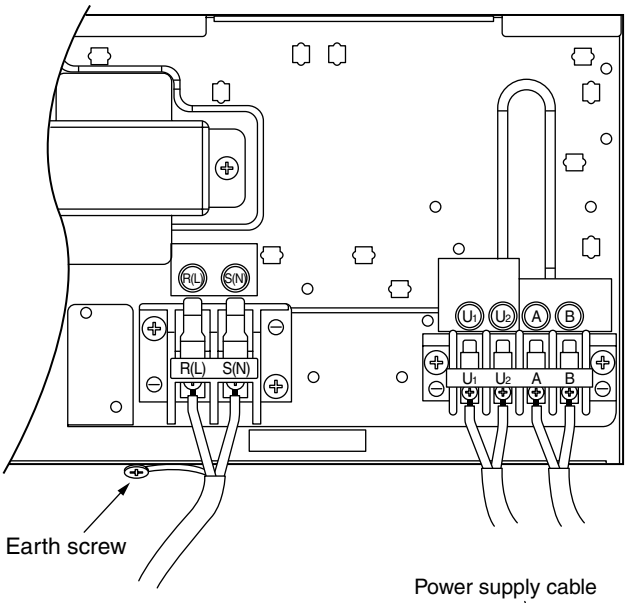


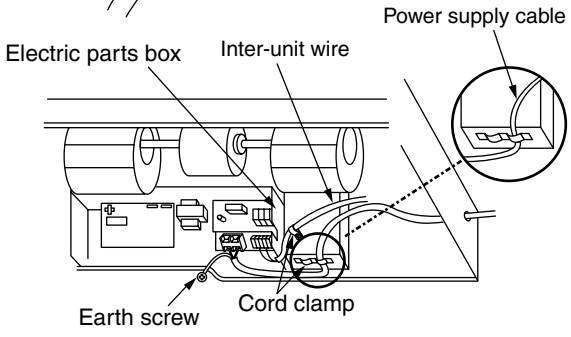
■ 1-way air discharge cassette type

Wiring the indoor unit

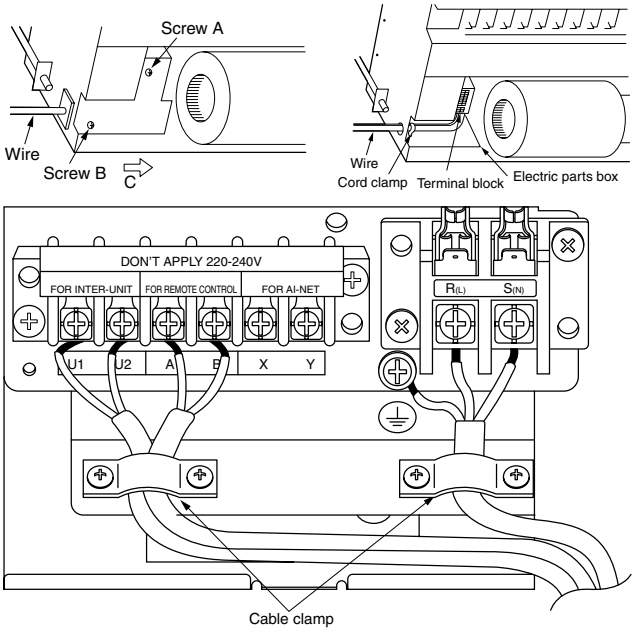
Be sure to connect wires matching the terminal numbers. Incorrect connection causes a trouble.

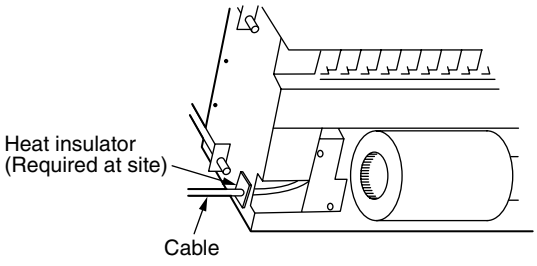
<SH type>





<YH type>





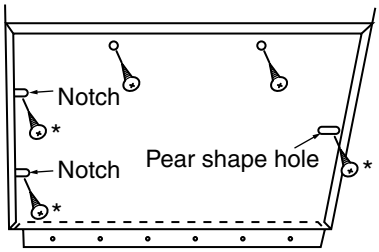
■ Concealed duct type

Wiring the indoor unit

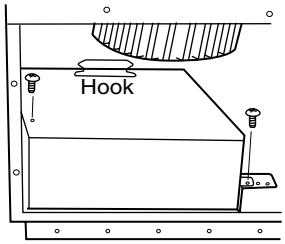
Be sure to connect wires matching the terminal numbers. Incorrect connection causes a trouble.

Wiring to electric parts box

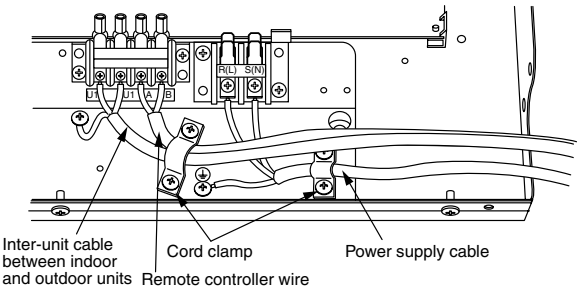
• Connect cables to the electric parts box as shown in the following figure



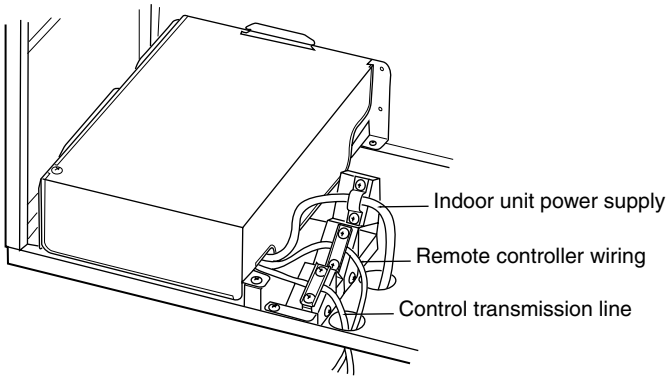
Loosen three screws (*) at both sides, and remove two screws, and take off the shield plate sliding it.



Remove two screws, and take off upper cover of the electric parts box from the hook.

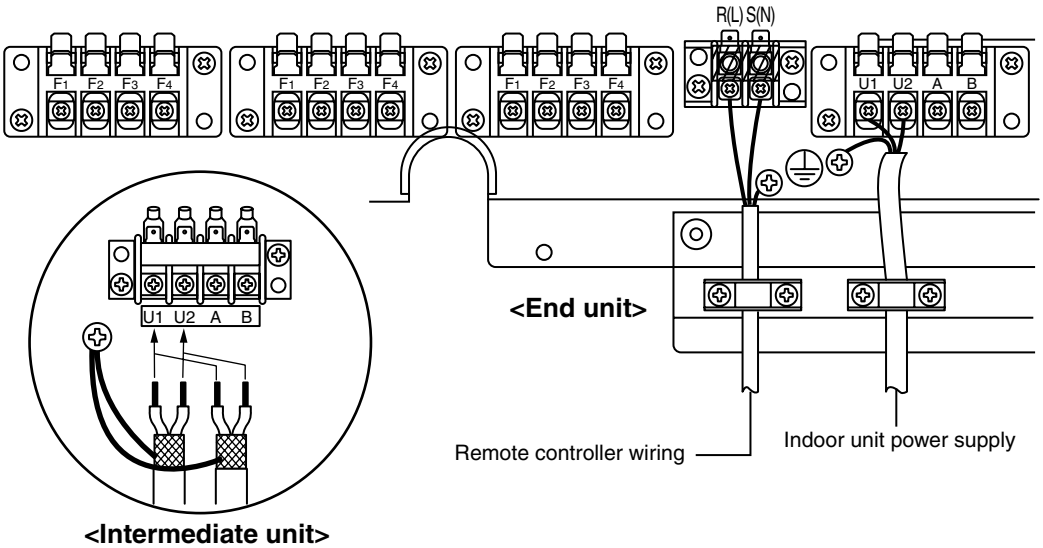


(LN terminal)
Indoor unit power supply
(U1, U2 terminal)
Transmission line for control
(AB terminal)
Remote controller cabling

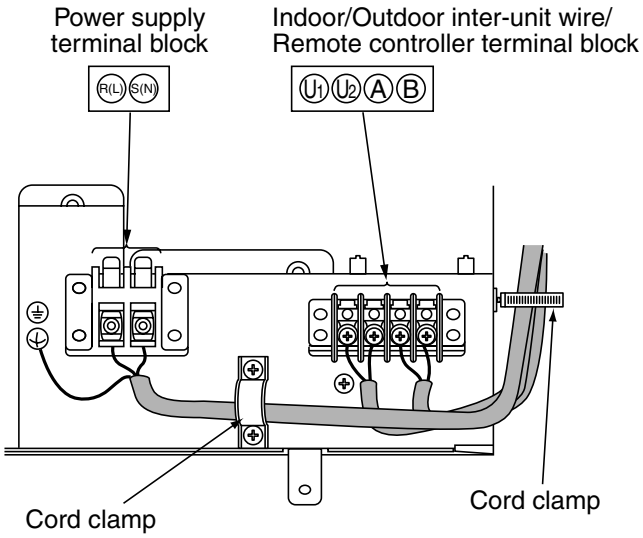


• Be sure fix the cables from outside of indoor unit in the following figure

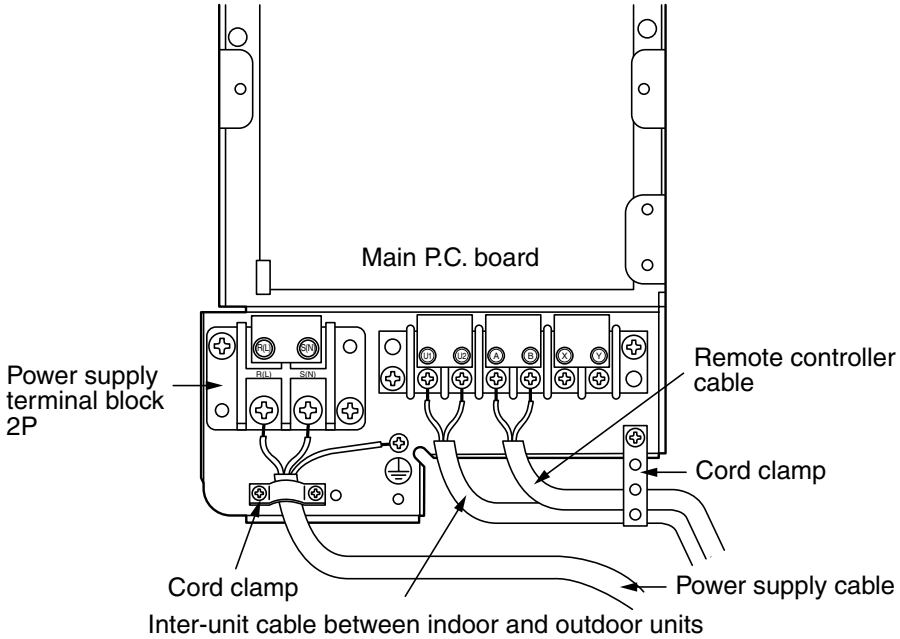
■ Concealed duct high static pressure type



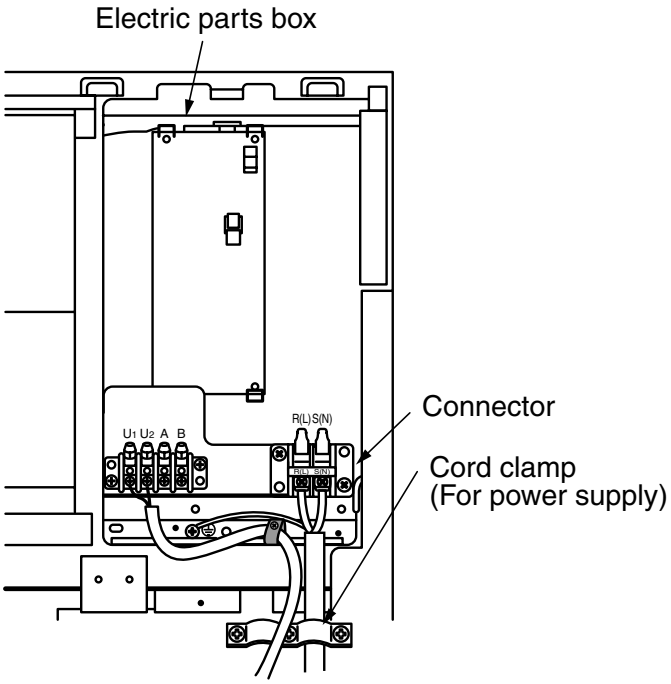
■ Under Ceiling Type



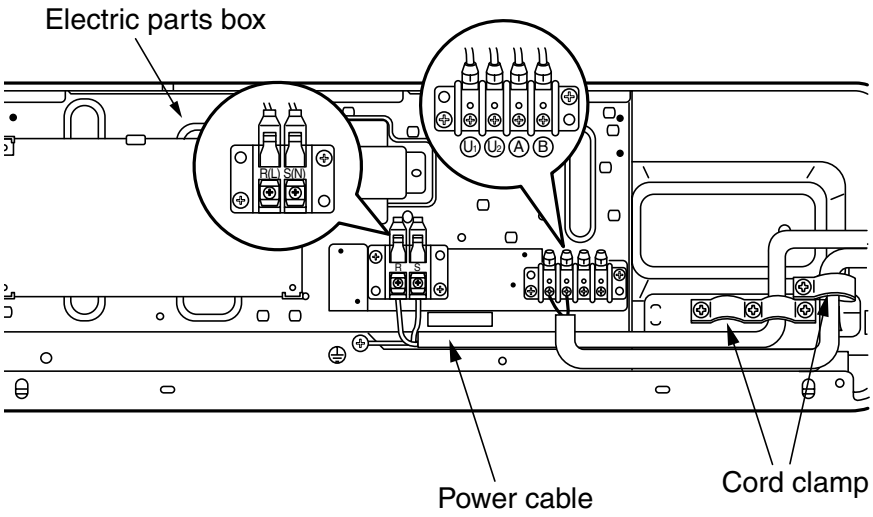
■ High wall type (1 series)



■ Floor standing cabinet type



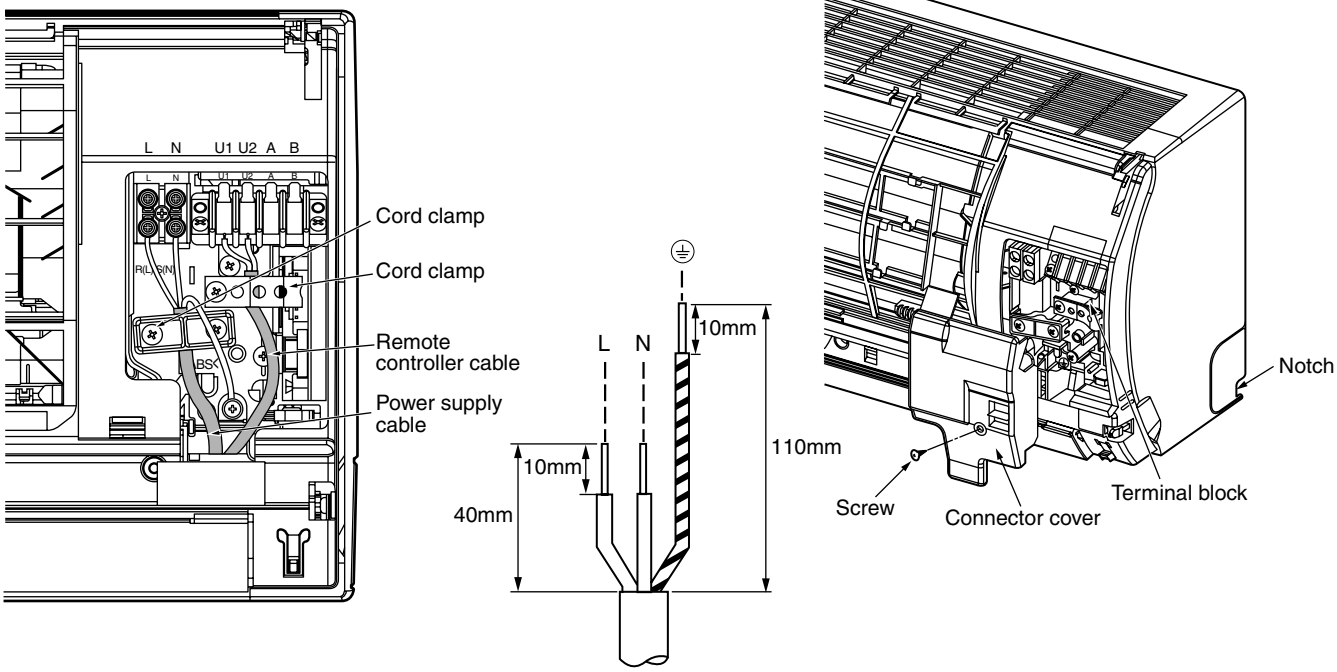
■ Floor standing concealed type



NOTE :

Fix the cord clamp matching to the wire size.

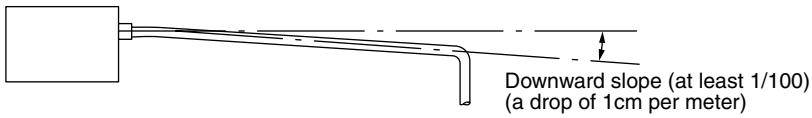
■ High wall type (2 series)



11. DRAIN PIPE INSTALLATION

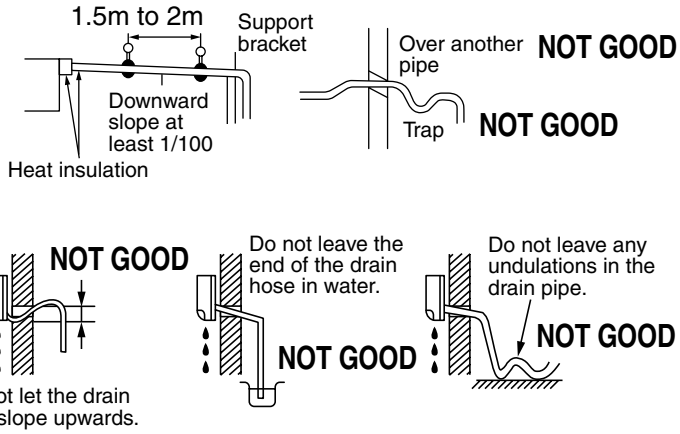
11-1. Natural Draining

1. The drain pipe should have a downward slope of at least 1/100.
2. The drain pipe should be as short as possible, and routed so that air pockets will not form.



3. The horizontal run should be as short as possible. If it must be long, support it with hanging supports at the prescribed intervals (to prevent undulations in the pipe).

	Nominal diameter	Support bracket interval
Hard polyvinyl chloride pipe	25 to 40mm	Within 1.5 to 2m



CAUTION

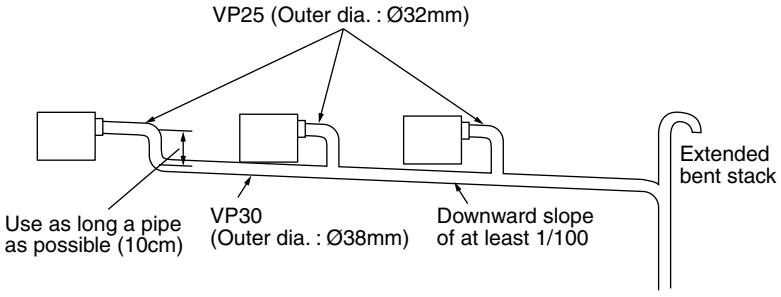
1) The drain pipe should be at least as large as the size of the drain pipe connector on the indoor unit.
2) Insulate drain pipes completely.
   Failure to insulate drain pipes will allow condensation to form.
   Insulate the pipe and the connector on the indoor unit as well.

Insulation	Polyethylene foam with a thickness of 6mm

3) Make all connections completely.
   (Especially when using polyvinyl chloride pipe, do not forget to apply the adhesive for hard polyvinyl chloride.)

11-2. Collective Drain Piping

1. Connections to a horizontal main pipe should be dropped in from above. Furthermore, use pipe with a nominal diameter of at least VP20 (VP30) for the collective drain pipe.
2. Limit as much as possible the number of units that drain into a collective pipe in order to keep the length of the horizontal main pipe to a minimum.
3. Do not connect models with a built-in drain pump and models that use gravity drains to the same horizontal pipe.


VP25 (Outer dia. : Ø32mm)
Extended bent stack
Use as long a pipe as possible (10cm)
VP30
(Outer dia. : Ø38mm)
Downward slope of at least 1/100

11-3. Selecting the Diameter for the Collective Pipe

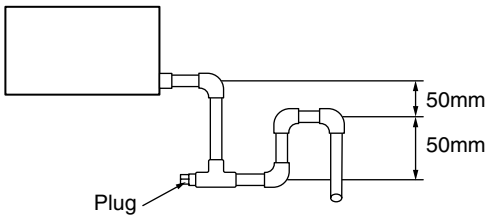
Calculate the amount of drain water based on the number of indoor units that will be connected to the collective drain pipe, and select the pipe diameter accordingly.
Assume 2 liters/hour per horsepower for the amount of drain water produced by an indoor unit.

- The above table is for a horizontal pipe.

Nominal	Inner dia. (mm)	Allowable volume (Grading 1/100)
30	31	88 l/hr
40	40	175 l/hr
50	51	334 l/hr

11-4. Drain Trap

1. When a drain pipe is connected to an indoor unit that will create negative pressure (concealed duct high static pressure type), install a drain trap.
2. Install one drain trap for each indoor unit.
   (A drain trap that is installed downstream of a junction of drain pipes from two or more indoor units will be ineffectual.)
3. Install a cleanout plug in the drain trap.



11-5. Drain Check

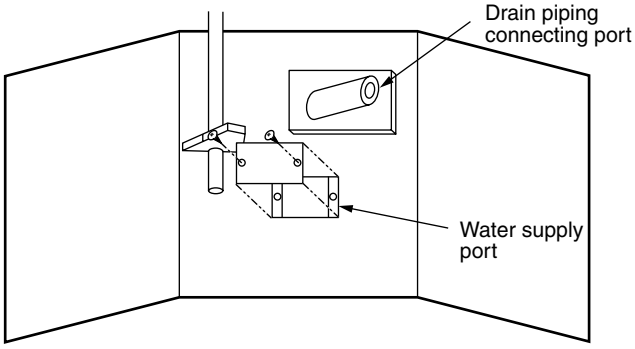
After the drain pipe has been fully installed, place water in the drain pan and confirm that the water drains properly.

1) 4-way air discharge cassette type (with built-in drain pump)

<When checking after all electrical work has been completed>

1. While the cooling operation is in action, remove the cover of the water supply opening as illustrated below and then use a water pump or other source to gradually add at least 1500 to 2000cc of water through the water supply opening.

   Check the draining action of the system by listening for the sound of the drain pump. If the drain pump sound changes from a continuous sound to an intermittent sound, the drain system is functioning normally.
2. After checking the system, re-attach the cover for the water supply opening.



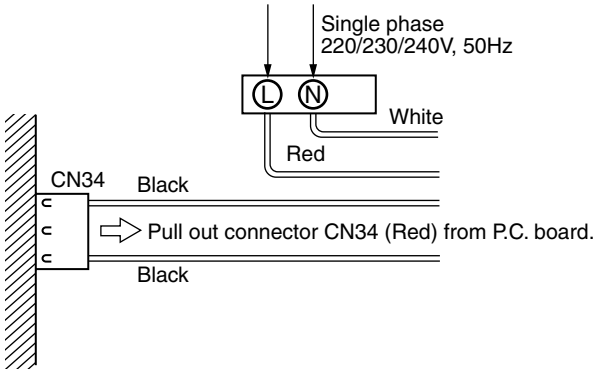
<When checking before all electrical work has been completed>

1. Firstly, unplug the float switch connector (CN34, 3P Red) in the electronic components box in the indoor unit, and then supply single-phase 220/230/240V, 50Hz power to Ⓛ and Ⓝ power terminals in the electronic components box. Never apply the voltage to terminals Ⓐ, Ⓑ, Ⓤ1, Ⓤ2.

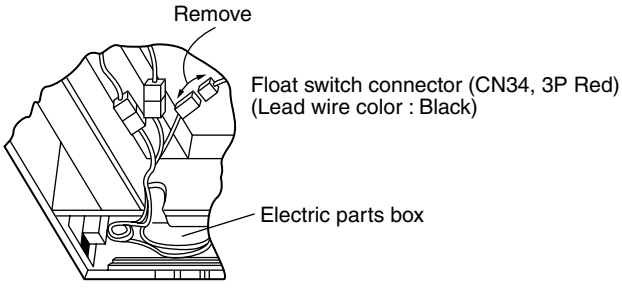
   The drain pump will not run if the float switch is not disconnected.

   Following the same procedure as when checking the system after the electrical work has been completed, check the draining action of the system by adding water through the water supply opening and then listening for the sound of the drain pump.
2. When the check of the drain system is completed, do not forget to restore the float switch CN34 connector to its original condition. Also re-attach the cover for the water supply opening.

4-Way Air Discharge Cassette Type, Concealed Duct Standard Type



2-Way Air Discharge Cassette Type

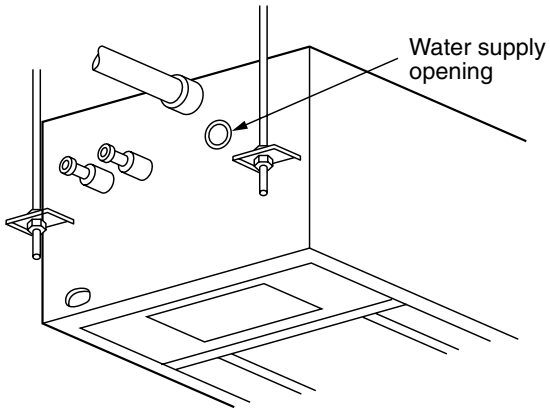


2) 2-way air discharge cassette type (with built-in drain pump)

<When checking after all electrical work has been completed>

1. While the cooling operation is in action, remove the rubber bushing from the water supply opening as illustrated below and then use a water pump or other source to gradually add at least 1200 to 1500cc of water through the water supply opening.

   Check the draining action of the system by listening for the sound of the drain pump. If the drain pump sound changes from a continuous sound to an intermittent sound, the drain system is functioning normally.
2. After checking the system, re-install the rubber bushing in the water supply opening, and attach the circular insulation provided to the bushing.

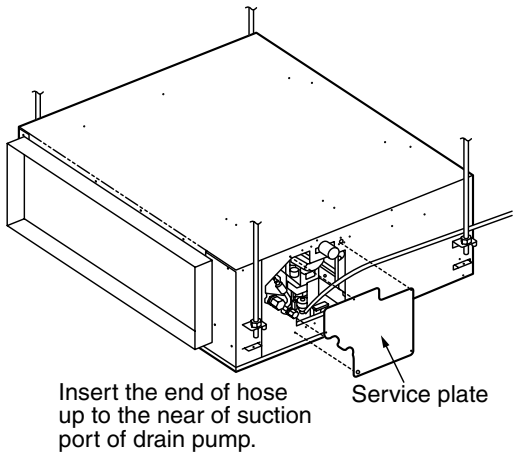


3) Concealed duct standard type (with built-in drain pump)

<When checking after all electrical work has been completed>

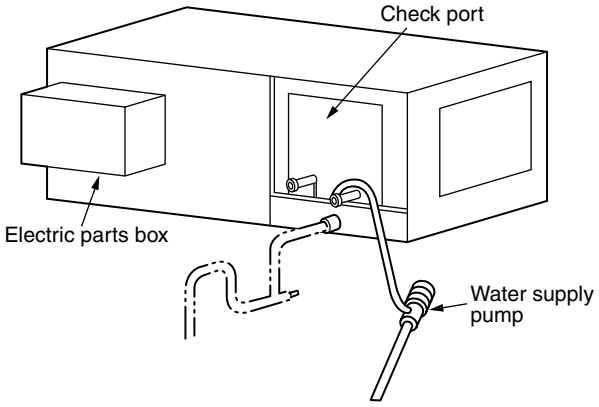
1. While the cooling operation is in action, remove the cover of the water supply opening as illustrated below and then use a water pump or other source to gradually add at least 1500 to 2000cc of water through the water supply opening.

   Check the draining action of the system by listening for the sound of the drain pump. If the drain pump sound changes from a continuous sound to an intermittent sound, the drain system is functioning normally.
2. After checking the system, re-attach the cover for the water supply opening.



4) Concealed duct high static pressure type

The concealed duct type and the concealed duct high static pressure type use gravity drains.
After the drain pipes have been installed, use a water pump or other source to place water in the drain pan, and then make sure that the water drains completely.



5) Under ceiling type

Remove the transport brackets before beginning work.

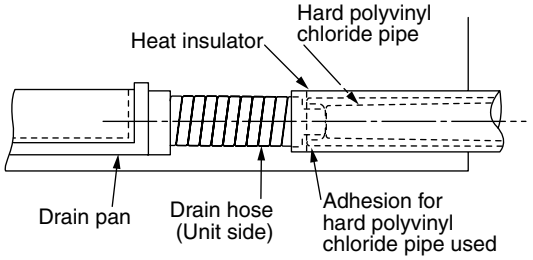
⚠ CAUTION

Insulate drain pipes completely, including the connections. Failure to insulate drain pipes will allow condensation to form.

Piping and Insulation

<Indoor unit>

Piping	Hard polyvinyl chloride pipe ; nominal dia. (inner dia.) : Ø20mm
Heat insulator	Vesicant polyethylene : Thickness ; 6mm or more



Piping methods

1. Installing drain pipe to rear

   Fix the drain pipe holding plate with screws at the bottom of the rear knockout hole, and then secure the drain pipe in place with a nylon band.
   Make sure that the nylon band's link point is on the inner side of the unit (above the drain pipe holding plate). If only the drain pipe will be routed out the rear of the unit, use just the drain pipe knockout hole.

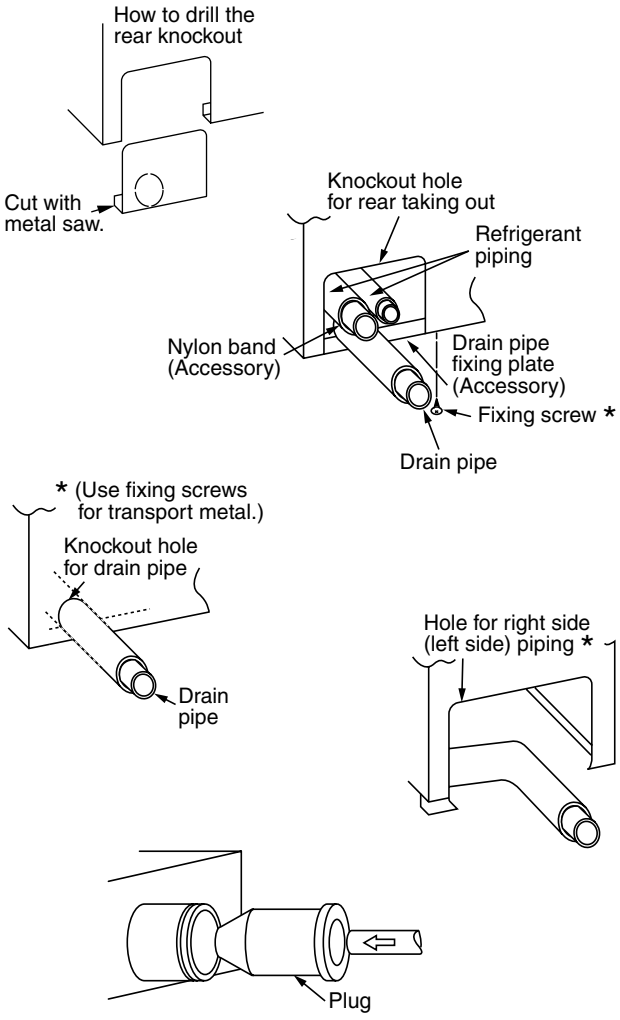
2. Installing drain pipe to the left or right

   Install the drain pipe so that it is horizontal.

   * When running the drain pipe out of the left side of the unit, open the knockout hole. Also move the drain hose from the right side to the left, and move the plug from the left side to the right. Use a blunt-tipped object to push the plug in all of the way to its base.

   After piping work has been completed, use the insulation provided to seal all gaps around the knockout.

   (Cut the insulation to the necessary shape.)


How to drill the rear knockout
Cut with metal saw.
Knockout hole for rear taking out
Refrigerant piping
Nylon band (Accessory)
Drain pipe fixing plate (Accessory)
Fixing screw *
Drain pipe
* (Use fixing screws for transport metal.)
Knockout hole for drain pipe
Drain pipe
Hole for right side (left side) piping *
Plug

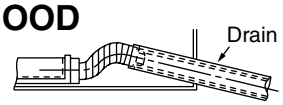
⚠ CAUTION

Tightly closing the nylon band will lessen the effectiveness of the insulation. Only tighten the nylon band to the extent that it does not change the shape of the insulation.

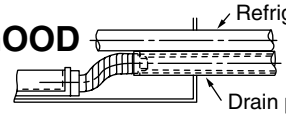
⚠ CAUTIONS

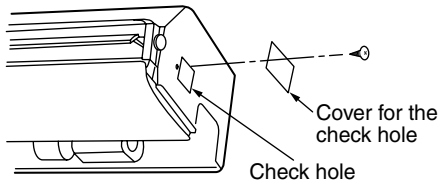
1. Because the drain is a gravity drain, make sure that the piping outside of the unit has a downward slope.
2. If the piping is installed as shown in the illustrations, it will not drain. Avoid these conditions.
3. Once piping installation is complete, remove the cover for the check hole located on the right side of the unit, add water to the drain pan through the check hole, and make sure that the water drains completely.

NOT GOOD



NOT GOOD





6) High wall type (1 series)

⚠ CAUTIONS

Install the drain pipe in accordance with the Installation Manual so that the water is drained completely, and insulate the pipes so that no condensation forms n them.

Improper pipe installation could result in water leaking indoors on furniture, etc.

⚠ REQUIREMENTS

- Insulate indoor drain pipes completely.
- Insulate the connection with the indoor unit.

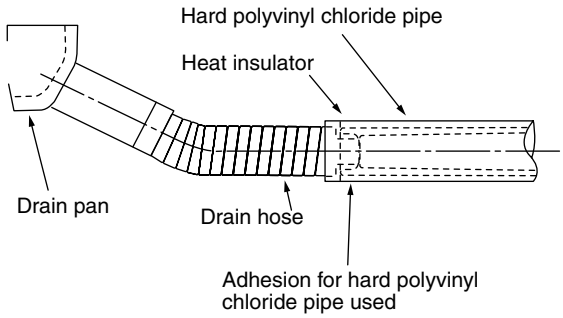
  Incomplete insulation could result in condensation forming.
- Make sure that the drain pipe slopes downwards at a rate of 1/100 or more, do not route the drain pipe over another pipe, and do not create a trap.

  These can all cause unusual sounds.
- Do not apply undue force to the drain pipe connection.

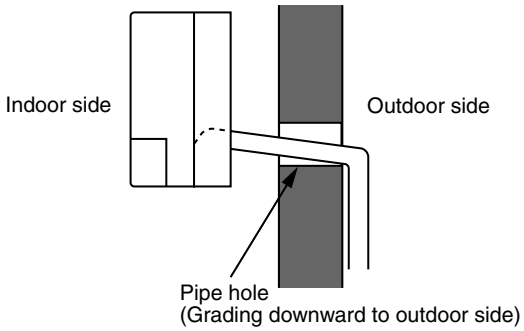
Piping and Insulation

Arrange for the following materials on site for the pipe installation and insulation work.

Piping	Hard polyvinyl chloride pipe ; nominal dia. (inner dia.) : Ø20mm
Heat insulator	Vesicant polyethylene : Thickness ; 6mm



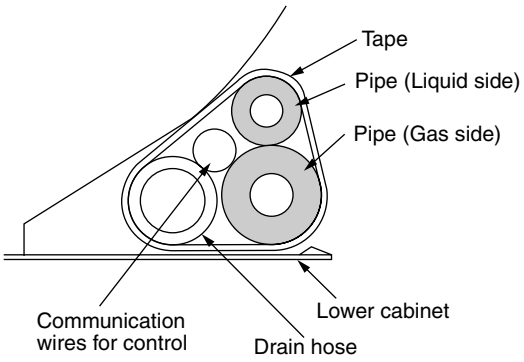
- When extending the drain hose, make the connection as shown in the figure at right.
- Because the drain is a gravity drain, the pipes outside of the unit must have a downward slope.
- Once the piping work is complete, pour water in the drain pan and make sure that the water drains completely.



Pipe and Drain Hose Formation

The drain pipe can be routed out of the rear, left, or right side of the unit.

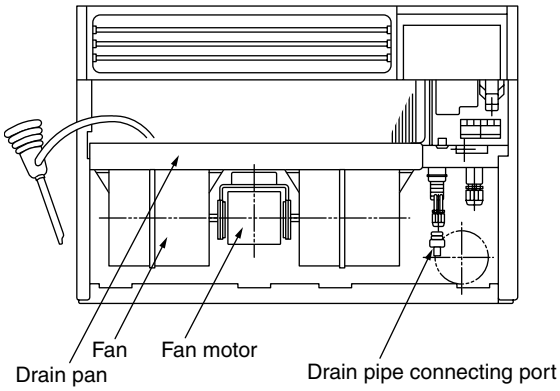
1. When routing the drain pipe out the left or right side, align the pipe and drain hose as shown in the figure. Make sure that the hose does not stick out the rear of the unit.
2. When routing the pipe out the left side, attach the installation plate and then pull the refrigerant pipe, drain pipe, and wiring through a hole made in the wall ahead of time in alignment with the position of the connections, make the connections to the rear of the unit, and then arrange the pipes, etc., as shown in the figure.



7) Floor standing cabinet type

Piping	Hard polyvinyl chloride pipe ; nominal dia. (inner dia.) : Ø20mm
Heat insulator	Vesicant polyethylene : Thickness ; 6mm or more

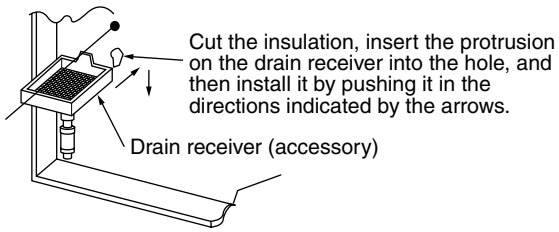
1. Because the drain is a gravity drain, the pipes outside of the unit must have a downward slope.
2. Once the piping work is complete, pour water in the drain pan and make sure that the water drains completely.



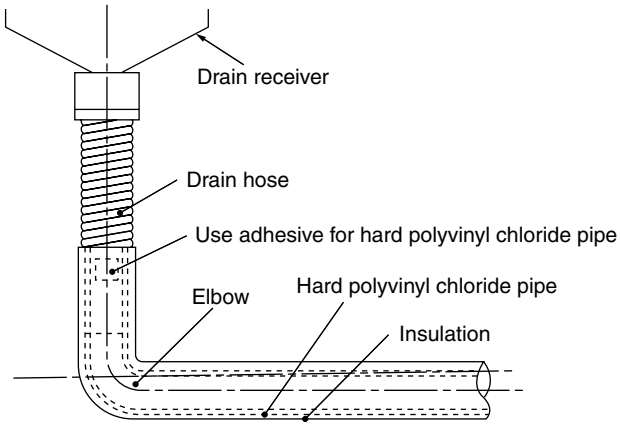
8) Floor standing concealed type

Installation of accessories

Install the drain receiver (accessory) on the pipe side of the indoor unit.


Cut the insulation, insert the protrusion on the drain receiver into the hole, and then install it by pushing it in the directions indicated by the arrows.
Drain receiver (accessory)

Piping and Insulation



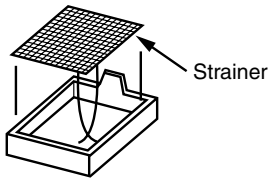
⚠ CAUTIONS

1. Make sure that the drain pipe slopes downwards at a rate of 1/100 or more, do not route the drain pipe over another pipe, and do not create a trap.
2. Limit horizontal runs of drain pipe to no more than 20m (not including change in height). If a drain pipe is long, prevent undulations in the pipe by installing support brackets along the pipe. Never use an air escape pipe. The drain water may blow out of such a pipe.
3. If using a collective drain pipe, install a VP30 or equivalent pipe with a downward slope of at least 1/100. Apply adequate insulation (at least 6mm of polyethylene foam) to the drain pipe, as in the case of a refrigerant pipe.
4. Once pipe installation is complete, pour water into the drain receiver and make sure that the water drains. Check for leaks at the hose connection.

CAUTION

Sometimes, debris will accumulate in the drain receiver while installation work is in progress. Remove the strainer from the drain receiver and clean it.

After cleaning the strainer, replace it in the drain receiver.



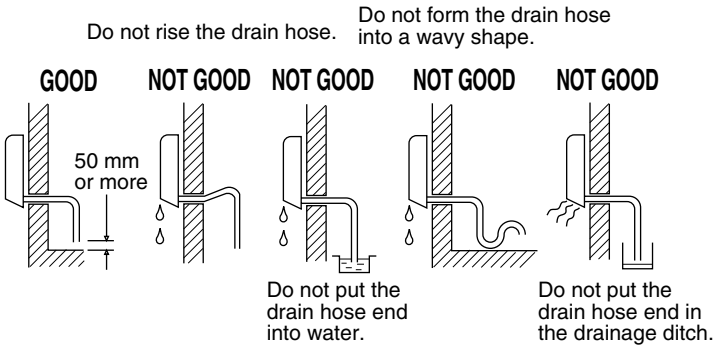
9) High wall type (2 series)

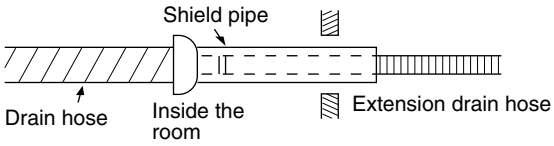
1. Run the drain hose sloped downwards.

NOTE

- Hole should be made at a slight downward slant on the outdoor side.

2. Put water in the drain pan and make sure that the water is drained out of doors.
3. When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

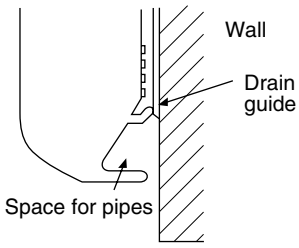

Do not rise the drain hose.
Do not form the drain hose into a wavy shape.
GOOD
NOT GOOD
NOT GOOD
NOT GOOD
NOT GOOD
50 mm or more
Do not put the drain hose end into water.
Do not put the drain hose end in the drainage ditch.



CAUTION

Arrange the drain pipe for proper drainage from the unit.

Improper drainage can result in dew- dropping.



This air conditioner has the structure designed to drain water collected from dew, which forms on the back of the indoor unit, to the drain pan.

Therefore, do not store the power cord and other parts at a height above the drain guide.

11-6. Cautions Concerning High Drains

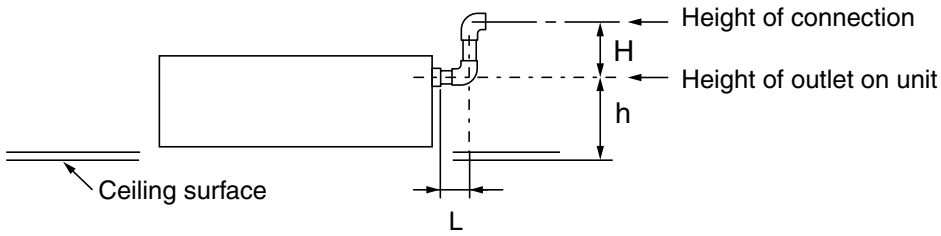
Observe the following cautions when installing a drain pipe to a drain that is higher than the unit.

1) Cautions on drain installation work

1. The unit must be installed horizontally.
2. The height to the drain outside the unit must be within the specified limit.
3. The rising pipe should be within 100mm of the drain.
4. The drain pipe must have a downward slope of at least 1/100.
   (After installing the piping, adjust the unit in the vertical direction carefully.)
5. When using a collective pipe, the drain pipe must drop at least 100mm before it empties into the collective pipe.
6. Insulate the drain pipe completely.

2) Height of a high drain outside of the unit

Drain pump bult-in type



Type	Indoor unit type	Allowable height of drain-up outside of unit (Condition)		
		Position of main unit drain port	Allowable height of drain-up (From drain port of main unit)	L
Drain pump incorporated	4-way air discharge cassette type MMU-AP ★★★★ H	h = 210 mm	H = 640 mm	300 mm or less
	2-way air discharge cassette type MMU-AP0071WH to 0301WH	H = 348 mm	H = 160 mm	100 mm or less
	2-way air discharge cassette type MMU-AP481WH	h = 356 mm	H = 160 mm	100 mm or less
	1-way air discharge cassette type MMU-AP0151SH, AP0181SH, AP0241SH	h = 160 mm	H = 340mm	140 mm or less
	1-way air discharge cassette type MMU-AP0071YH, AP0091YH, AP0121YH	h = 200 mm	H = 150 mm	100 mm or less
	Concealed duct standard type MMD-AP ★★★★ BH	h* = 280 mm * From unit bottom surface	H = 270 mm	100 mm or less

12. ADJUSTMENT OF AIR DIRECTION

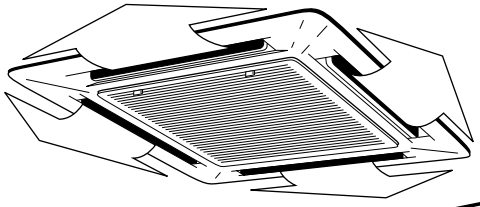
As the characteristics of air, cool air collects at lower levels, and hot air collects at higher levels.

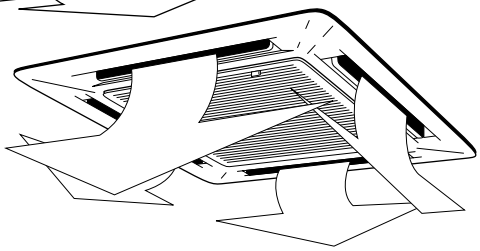
⚠ CAUTION

Set the louver so that air blows out horizontally.

If cooling operation is performed with the louver blowing air downwards, the air outlet or surface of the louver will be wet with dew, and dewdrop may fall down.

[4-way Air Discharge Cassette Type]





♦ In cooling operation

- Use the discharge louver with horizontal set point.

♦ In heating operation

- Use the discharge louver with downward set point.

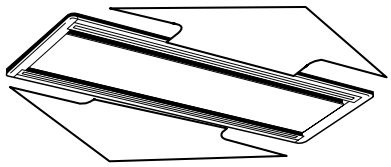
♦ When using panel with auto louver

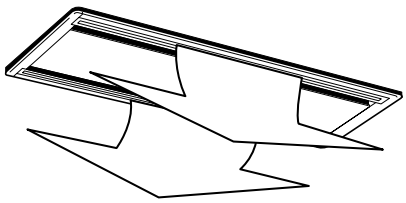
- When using a panel with auto louver, the discharge louver operates automatically by pushing the louver operation switch. Resulted from this, cooling/heating effect increases furthermore.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.
- Stop the louver operation during defrost operation.
- When "LOUVER" "MANUAL" are displayed intermittently on the remote controller, and disappear after a while, the panel has no auto louver function.

♦ 2-way/3-way air discharge

2-way discharge or 3-way discharge can be selected according to the shape or arrangement of the room. For details, consult with the dealer which you have purchased the air conditioner.

[2-way Air Discharge Cassette Type]





♦ In cooling operation

Use the discharge louver with horizontal set point.

♦ In heating operation

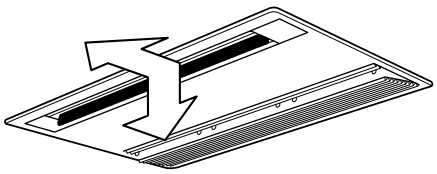
Use the discharge louver with downward set point.

♦ When using panel with auto louver

- When using a panel with auto louver, the discharge louver operates automatically by pushing the louver operation switch. This increases the cooling/heating effect.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.
- Stop the louver operation during defrost operation.
- When "LOUVER" "MANUAL" are displayed intermittently on the remote controller, the panel has no auto louver function.

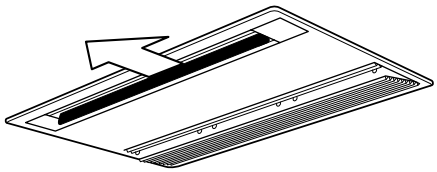
[1-way Air Discharge Cassette Type]

<Up/Down air direction adjustment>



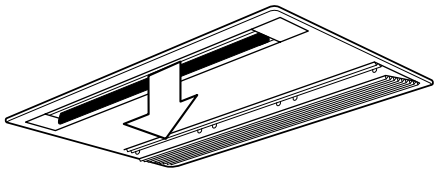
Auto louver :

- When pushing LOUVER switch, the discharge louver operates automatically.
  This increases the cooling/heating effect.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.
- Stop the louver operation during defrost operation.



♦ **In cooling operation**

In cooling operation, use the discharge louver with horizontal set point so that cool air diffuses the whole room.

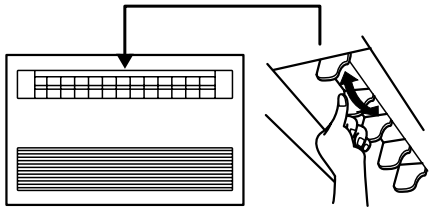


♦ **In heating operation**

In heating operation, use the discharge louver with downward set point so that the hot air is spread to the floor.

<Left/Right air direction adjustment>

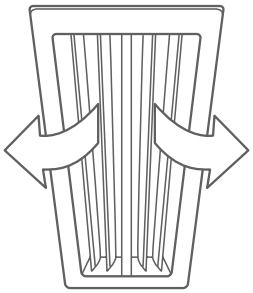
When you change the blowout direction to left/right, direct the vertical grille inside of the discharge louver to desired direction.



[Concealed Duct Type]

When using the discharge grille unit, adjust the air direction as follows.

* For providing the discharge grille locally, contact to the sales dealer.



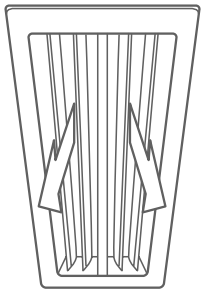
♦ **In cooling operation**

In cooling operation, use the discharge louver with horizontal set point so that cool air diffuses the whole room.

♦ **In heating operation**

In heating operation, use the discharge louver with downward set point so that the hot air is spread at the foot.

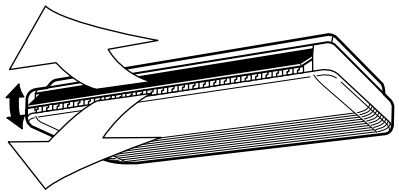
♦ **Using discharge port unit with auto louver**



- When pushing LOUVER operation switch on the remote control, the discharge louver operates automatically. This increases the cooling/heating effect.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.
- Stop the louver operation during defrost operation.
- When “LOUVER” “MANUAL” are displayed intermittently on the remote controller, and disappear after a while, the panel has no auto louver function.

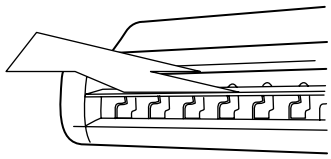
[Under Ceiling Type]

<Up/Down air direction adjustment>



Auto louver :

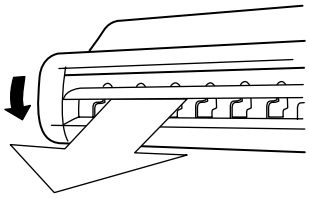
- When pushing LOUVER operation switch on the remote controller, the discharge louver operates automatically. This increases the cooling/heating effect.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.



- Stop the louver operation during defrost operation.

♦ **In cooling operation**

In cooling operation, use the discharge louver with horizontal set point so that cool air diffuses the whole room.

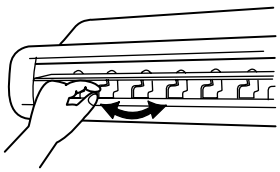


♦ **In heating operation**

In heating operation, use the discharge louver with downward set point so that the hot air is spread at the foot.

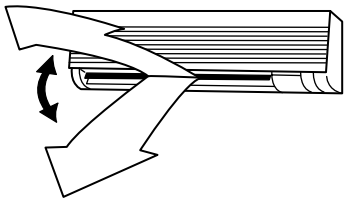
<Left/Right air direction adjustment>

When you change the blowout direction to left/right, direct the vertical grille inside of the discharge louver to desired direction.



[High Wall Type (1 series)]

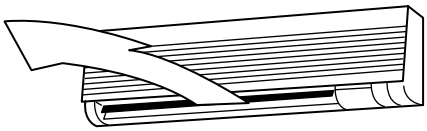
The horizontal louver can operate automatically in order to increase the cooling/heating effect.



<Up/Down air direction adjustment>

Auto louver :

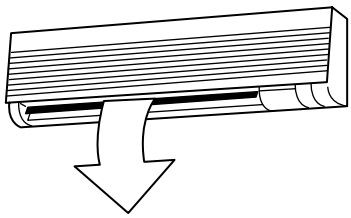
- When pushing LOUVER operation switch on the remote controller, the discharge louver operates automatically.
- The louver operation switch can be handled only while the operation lamp (Green) goes on.



- Stop the louver operation during defrost operation.

♦ **In cooling operation**

In cooling operation, use the discharge louver with horizontal set point so that cool air diffuses the whole room.



♦ **In heating operation**

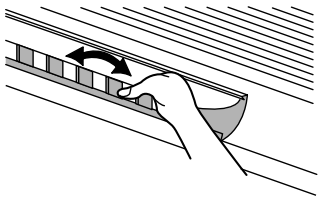
In heating operation, use the discharge louver with downward set point so that the hot air is spread at the foot.

REQUIREMENT

- If cooling operation is performed with the louver blowing air down-wards, the surface of the cabinet or discharge louver is wet with dew, and dewdrop may fall down.
- When heating operation is performed with horizontal set point, unevenness of the room temperature may become large.
- Do not handle the discharge louver directly with hands. Select direction of the discharge louver by the LOUVER operation switch on the remote controller. The discharge louver does not stop immediately even if the switch has been pushed. Push the switch adjusting the stop position.

<Left/Right air direction adjustment>

When you change the blowout direction to left/right, direct the vertical grille inside of the discharge louver to desired direction.



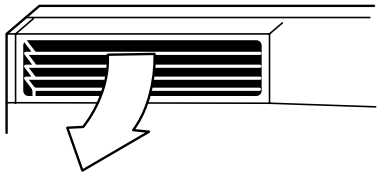
[Floor Standing Cabinet Type]

♦ In cooling operation

In cooling operation, use the discharge louver with upward set point so that cool air diffuses the whole room.

♦ In heating operation

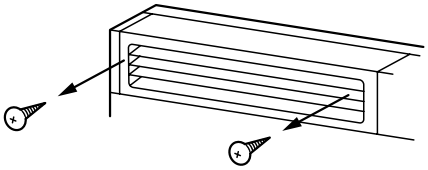
In heating operation, use the discharge louver with downward set point so that the hot air is spread at the foot.

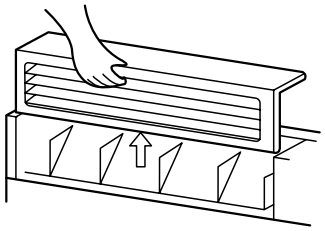


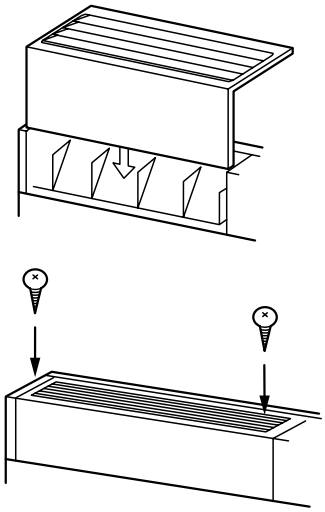
How to change discharge port

To change the discharge port, follow the procedure below.

1. Remove two fixing screws from the discharge port.
   (Fixing screws will be reused.)
2. Insert the hands into the discharge port, push up the rear side a little, and then remove the discharge port from the rear clip.
3. Lift the discharge port upward, and remove it.
4. Reverse the discharge port, and install it to the main unit.
   (For installation, be sure to hang it on clips at two rear positions and two lower positions.)
5. Be sure to fasten the discharge port with the removed fixing screws so that the discharge port is not out of place.





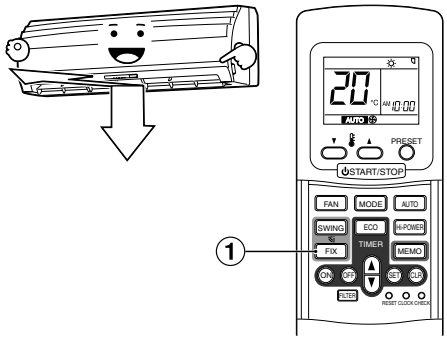


[High Wall Type (2 series)]

- Adjust the air flow direction properly. Otherwise, it might cause discomfort and make the room temperature uneven.
- Adjust the vertical air flow using the remote control.
- Adjust the horizontal air flow manually.

Adjust the vertical air flow

The air conditioner automatically adjusts the vertical air flow direction in accordance with the operating conditions when AUTO or A mode is selected.



To set the air flow direction you desire

Perform this function when the air conditioner is in operation.

① **FIX button**

Keep pressing or pressing briefly the FIX button on the remote control to move the flap in the desired direction.

- In subsequent operations, the vertical air flow is automatically set in the direction to which you adjusted the flap using the FIX button.

NOTE

Operating angle of vertical airflow flap will be different during cooling, dry and heating operation.

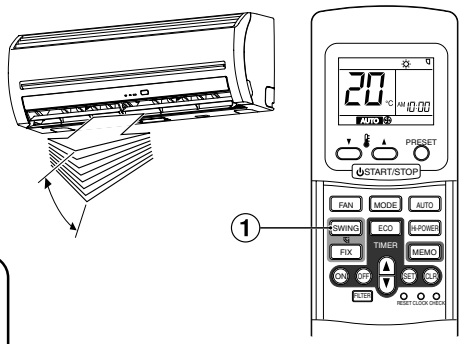
To automatically swing the air flow direction

Perform this function when the air conditioner is in operation.

① **SWING button**

Press the SWING button on the remote control.

- To stop the function, press the SWING button.



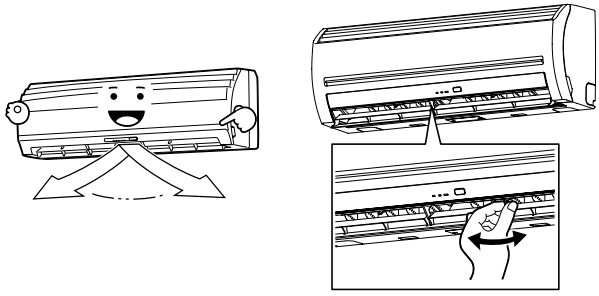
⚠ CAUTION

- The FIX and SWING buttons will be disabled when the air conditioner is not in operation (including when the ON TIMER is set).
- Do not operate the air conditioner for long hours with the air flow direction set downward during the cooling or dry operation. Otherwise, condensation may occur on the surface of the vertical air flow flap and cause dew dripping.
- Do not move the vertical air flow flap manually. Always use the FIX button.
  If you move the flap manually, it may malfunction during operation. If the flap malfunctions, stop the air conditioner once, and restart.
- When the air conditioner is started immediately after it was stopped, the vertical air flow flap might not move for 10 seconds or so.
- Flap operation is limited when performing group control.

Adjust the horizontal air flow

Preparation:

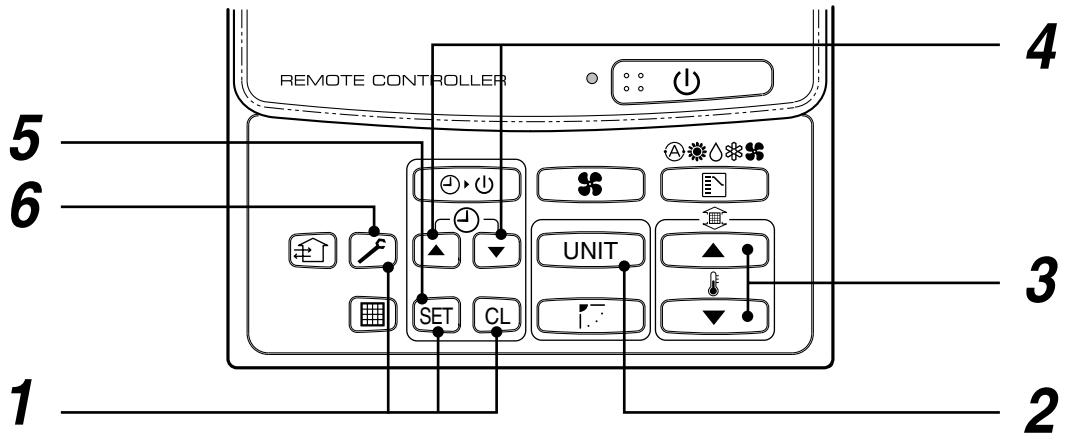
- Take hold of the lever on the horizontal air flow flap and move them to adjust the air flow direction as required.
- You can adjust the air flow at the left and right locations of the flap.



13. APPLIED CONTROL

13-1. Setup of Selecting Function in Indoor Unit (Be sure to Execute Setup by a Wired Remote Controller)

<Procedure> Execute the setup operation while the unit stops.



1 **Push [SET], [CL], and [🔧] buttons simultaneously for 4 seconds or more.**
The firstly displayed unit No. indicates the header indoor unit address in the group control.
In this time, the fan of the selected indoor unit is turned on.

2 **Every pushing [UNIT] button, the indoor unit numbers in the group control are successively displayed. In this time, the fan of the selected indoor unit only is turned on.**

3 **Specify the item code (DN) using the setup temperature [▲] and [▼] buttons.**

4 **Select the setup data using the timer time [▲] and [▼] buttons.**

(When selecting the DN code to "33", change the temperature indication of the unit from "°C" to "°F" on the remote controller.)

5 **Push [SET] button. (OK if display goes on.)**
- To change the selected indoor unit, return to procedure ***2***.
- To change the item to be set up, return to procedure ***3***.

6 **Pushing [🔧] button returns the status to normal stop status.**

CAUTION

Be sure to perform the item code (DN) setting as the "Cooling Only" for the cooling only indoor unit.
(DN number = "OFF")
If this setting is not performed, error code [L18] may occur.

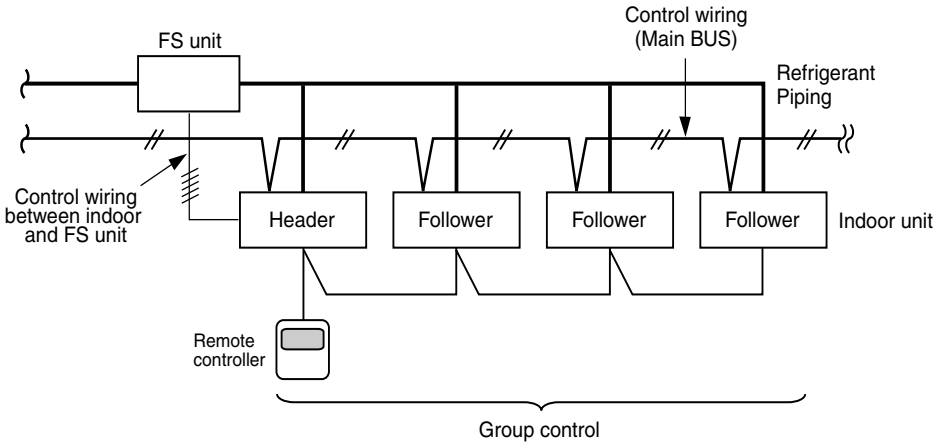
Table: Function selecting item numbers (DN)
(Items necessary to perform the applied control at the local site are described.)

DN	Item	Description	At shipment
01	Filter sign lighting time	0000 : None 0001 : 150H 0002 : 2500H 0003 : 5000H 0004 : 10000H	According to type
02	Dirty state of filter	0000 : Standard 0001 : High degree of dirt (Half of standard time)	0000 : Standard
03	Central control address	0001 : No.1 unit to 0064 : No.64 unit 0099 : Unfixed	0099 : Unfixed
04	Specific indoor unit priority	0000 : No priority 0001 : Priority	0000 : No priority
06	Heating temp shift	0000 : No shift 0001 : +1°C 0002 : +2°C to 0010 : +10°C (Up to +6 recommended)	0002 : +2°C (Floor type 0000: 0°C)
0d	Existence of automatic cool/heat mode	0000 : Provided 0001 : Not provided (Automatic selection from connected outdoor unit)	0001 : Not provided
0E	Plural indoor units control by one FS unit	0000 : Usual 0001 : Group control	0099 : Unfixed
0F	Cooling only	0000 : Heat pump 0001 : Cooling only (No display of [AUTO] [HEAT])	0000 : Heat pump
10	Type	0000 : (1-way air discharge cassette) 0001 : (4-way air discharge cassette) to 0037	According to model type
11	Indoor unit capacity	0000 : Unfixed 0001 to 0034	According to capacity type
12	Line address	0001 : No.1 unit to 0030 : No.30 unit	0099 : Unfixed
13	Indoor unit address	0001 : No.1 unit to 0064 : No.64 unit	0099 : Unfixed
14	Group address	0000 : Individual 0001 : Header unit of group 0002 : Follower unit of group	0099 : Unfixed
19	Flap type (Adjustment of air direction)	0000 : Not provided 0001 : Swing only 0004 : [4-way Air Discharge Cassette type] and [Under Ceiling type]	According to type
1E	Temp difference of automatic cooling/ heating mode selection COOL → HEAT, HEAT →COOL	0000 : 0 deg to 0010 : 10 deg (For setup temperature, reversal of COOL/HEAT by ± (Data value)/2)	0003 : 3 deg (Ts±1.5)
28	Automatic restart of power failure	0000 : None 0001 : Restart	0000 : None
29	Operation condition of humidifier	0000 : Usual 0001 : Condition ignored (Detection control for heat exchanger temperature)	0000 : Usual
2A	Selection of option/ error input (CN70)	0000 : Filter input 0001 : Alarm input (Air washer, etc.) 0002 : Humidifier input	0002 : Humidifier
2E	HA terminal (CN61) select	0000 : Usual 0001 : Leaving-ON prevention control	0000 : Usual (HA terminal)
30	Automatic elevating grille	0000 : Unavailable (Standard, Oil guard panel) 0001 : Available (Auto grille, Oil guard, Auto grille panel)	0000 : Unavailable
31	Ventilating fan control	0000 : Unavailable 0001 : Available	0000 : Unavailable
32	TA sensor selection	0000 : Body TA sensor 0001 : Remote controller sensor	0000 : Body TA sensor
33	Temperature unit select	0000 : °C (at factory shipment) 0001 : °F	0000 : °C
40	Control for humidifier (+ drain pump control)	0000 : None 0001 : Humidifier + Vaporizing system (Pump ON) 0002 : Humidifier + Ultrasonic system (Pump ON after specified time passed) (Unused) 0003 : Humidifier + Natural drain system (Pump OFF)	0003 : Humidifier ON, Pump OFF
5d	High ceiling selection (Air volume selection)	[4-way Air Discharge Cassette type] and [Under Ceiling type] 0000 : Standard filter 0001 : Super-long life [Concealed Duct Standard type] 0000 : Standard static pressure (40Pa) 0001 : High static pressure 1 (70Pa) 0003 : High static pressure 2 (100Pa) 0005 : Correspond to quiet sound 0006 : Low static pressure (20Pa)	0000 : Standard
60	Timer set (Wired remote controller)	0000 : Available (Operable) 0001 : Unavailable (Operation prohibited)	0000 : Available
62	Smudging-proof control clear	0000 : Clear	4- way Air Discharge Cassette type only
92	Outside interlock release condition	0000 : Operation stop 0001 : Release communication signal receive	0000 : Operation stop

13-2. Setting for plural indoor units control by one FS unit.

- Maximum 8 indoor units can be connected to one FS unit.
- Ensure that one main wired remote controller is connected in one group control.
- Setting of group address (Item code = 14) and plural indoor unit control (Item code = 0E) are necessary.
- Control wire for FS unit and main wired remote controller shall be connected to header indoor unit which group address is “1”.

When two or more indoor units are connected to one FS units, Item code setting is required.
Be sure to perform the following procedure after address setting.



Plural indoor unit control	DN=0E	0 → 1	0 → 1	0 → 1	0 → 1
Group Address	DN=14	1	2	2	2

How to set up DN=“0E”

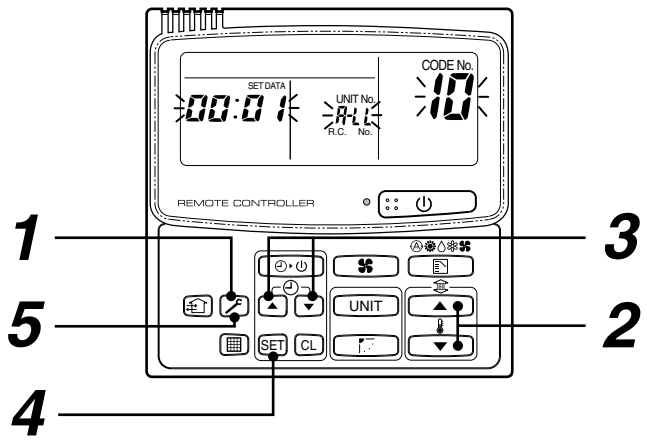
1 Push [HOME] + [WRENCH] buttons simultaneously for 4 seconds or more.
- Unit No ALL is displayed.
- The fans of all the indoor units in a group control are turned on.

2 Using the setup temp. [▲] / [▼] buttons, select 0E as the item code.

3 Using the timer time [▲] / [▼] buttons, set 01 to the item code.

4 Push [SET] button.

5 Pushing [WRENCH] button returns the status to normal stop status.



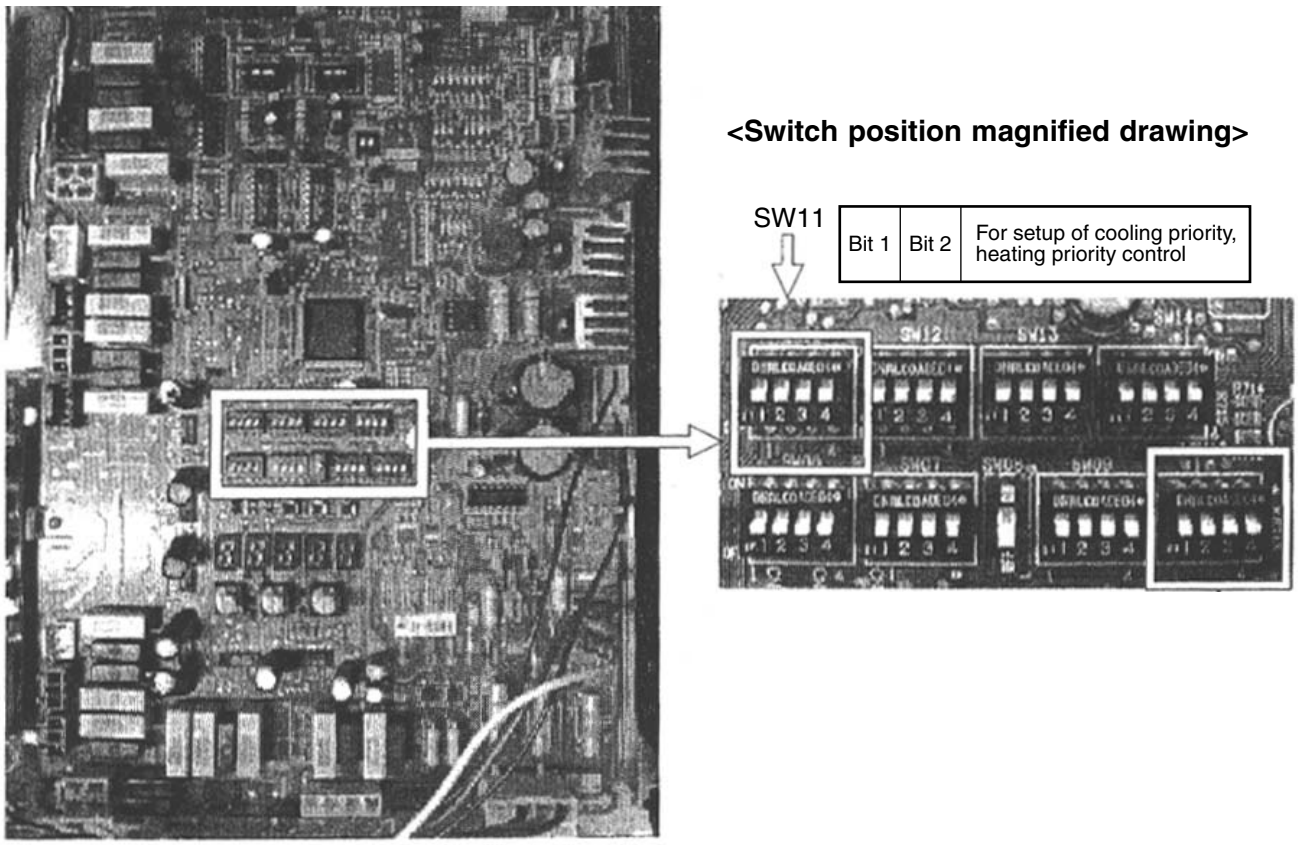
For the setup of group address, refer to “Manual address setup from remote controller” of “14. address setup”.

13-3. Applied Control in Outdoor Unit

The following functions become available by setting the switches on the outdoor interface P.C. board.

No.	Function	Switch No.	Bit
1	Outdoor fan high static pressure shift	SW10	2

<Interface P.C. board of outdoor unit>



<Switch position magnified drawing>

Outdoor fan High Static Pressure Shift

■ Usage/Features

This function is set when connecting a duct to discharge port of the outdoor unit.

■ Setup

Turn “Bit 2” of the Dip switch [SW10] on the interface P.C. board of the outdoor unit to ON side. For the outdoor units which are connected with the ducts, set this function regardless of the header unit or follower unit.

■ Specifications

Increase No. of rotations of the propeller fan of the outdoor fan so that a duct with the maximum external static pressure 35Pa can be installed. If installing a discharge duct (Below 35Pa (3.5mmAq)) exceeding the duct resistance 15Pa, execute this setup.

Discharge air volume in each outdoor unit is described in the following table.

Capacity rank (MMY-MAP)	0802 type	1002, 1202 type
Standard air volume of outdoor unit (m^3/min.)	165	175

■ Options

35Pa or more as the external static pressure is also available. (Ex. 45Pa)

For details of adjustment, consult the sales subsidiary.

14. ADDRESS SETUP

In this air conditioner, it is necessary to set up the indoor address before starting the operation. Set up the address in the following procedure.

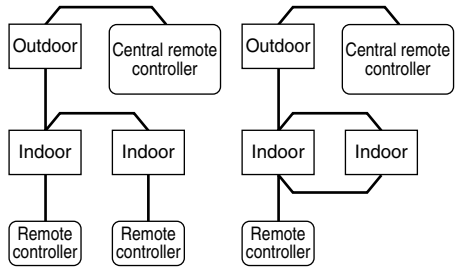
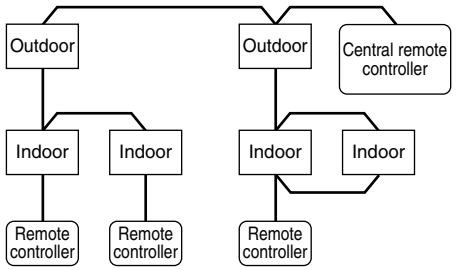
CAUTION

1. Set up address after wiring work.
2. Be sure to turn on the power in order of indoor unit → outdoor unit. If turning on the power in the reverse order, a check code [E19] is output. When a check code is output, turn on the power again.
3. It requires maximum 10 minutes (Usually, approx. 5 minutes) to set up automatically an address to 1 system.
4. To set up an address automatically, the setup at outdoor side is necessary. (Address setup cannot be performed by power-ON only.)
5. To set up an address, it is unnecessary to operate the air conditioner.
6. Manual address setup is also available besides automatic setup.
   Automatic address : Setup from SW15 on the interface P.C. board of the outdoor unit
   Manual address : Setup from the wired remote controller
   * It is temporarily necessary to set the indoor unit and wired to 1 : 1. (In group operation and in time without remote controller)

1. Automatic Address Setup

Without central control : To the address setup procedure 1
With central control : To the address setup procedure 2

(However, go to the procedure 1 when the central control is performed in a single refrigerant system.)

(Example)	In case of central control in a single refrigerant system	In case of central control over refrigerant systems
Address setup procedure	To procedure 1	To procedure 2
Wire systematic diagram		

Address setup procedure 1

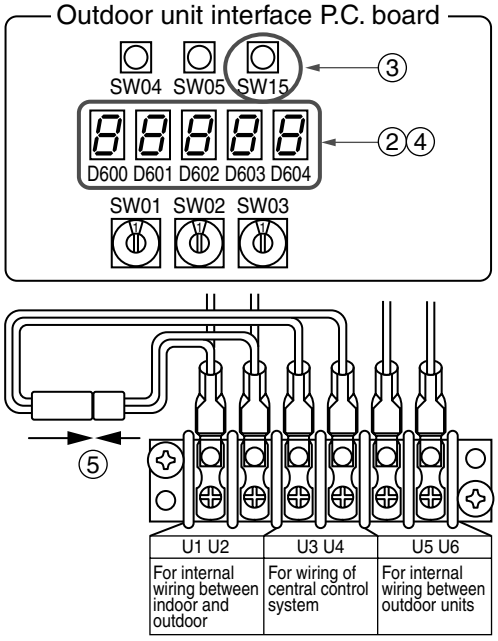
① Turn on power of indoor/outdoor units.
(In order of indoor → Outdoor)

② After approx. 1 minute, check that **U. 1. L08** (U. 1. flash) is displayed in 7-segment display section on the interface P.C. board of the header outdoor unit.

③ Push SW15 and start setup the automatic address.
(Max. 10 minutes for 1 line (Usually, approx. 5 minutes))

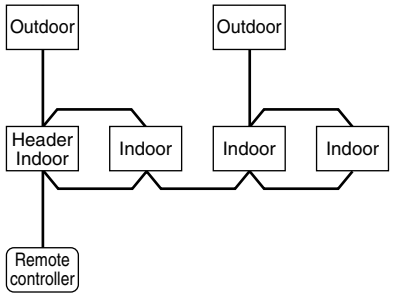
④ When the count Auto 1 → Auto 2 → Auto 3 is displayed in 7-segment display section, and it changes from
U. 1. - - - (U. 1. flash) to
U. 1. - - - (U. 1. light), the setup finished.

⑤ When perform a central control, connect a relay connector between [U1U2] of the header outdoor unit and [U3U4] terminals.

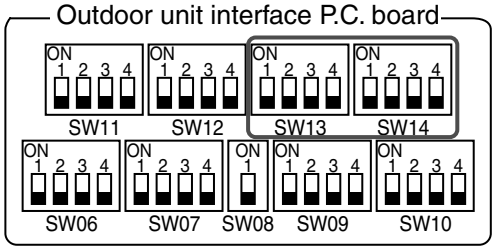


REQUIREMENT

- When a group control is performed over the multiple refrigerant systems, be sure to turn on the power supplies of all the indoor units connected in a group in the time of address setup.
- If turning on the power for each refrigerant system to set up address, a header indoor unit is set for each system. Therefore, an alarm code "L03" (Duplicated header indoor units) is output in operation after address setup. In this case, change the group address from the wired remote controller so that only one header indoor unit is set up.

(Example)	Group control over multiple refrigerant systems
Wire systematic diagram	

Address setup procedure 2



① Using SW13 and 14 on the interface P.C. board of the header outdoor unit in each system, set up the system address for each system.
(At shipment from factory: Set to Address 1)

Note) Be careful not to duplicate with other refrigerant system or other line (system) address.

Line (System) address switch on outdoor interface P.C. board (○: Switch ON, × : Switch OFF)

Line address	SW13				SW14			
	1	2	3	4	1	2	3	4
1				×	×	×	×	×
2				×	○	×	×	×
3				×	×	○	×	×
4				×	○	○	×	×
5				×	×	×	○	×
6				×	○	×	○	×
7				×	×	○	○	×
8				×	○	○	○	×
9				×	×	×	×	○
10				×	○	×	×	○
11				×	×	○	×	○
12				×	○	○	×	○
13				×	×	×	○	○
14				×	○	×	○	○

Line address	SW13				SW14			
	1	2	3	4	1	2	3	4
15				×	×	○	○	○
16				×	○	○	○	○
17				○	×	×	×	×
18				○	○	×	×	×
19				○	×	○	×	×
20				○	○	○	×	×
21				○	×	×	○	×
22				○	○	×	○	×
23				○	×	○	○	×
24				○	○	○	○	×
25				○	×	×	×	○
26				○	○	×	×	○
27				○	×	○	×	○
28				○	○	○	×	○

: Is not used for setup of line (system) address. (Do not change setup.)

② Check that the relay connectors between [U1U2] and [U3U4] terminals are come out in all the header outdoor units to which the central control is connected. (At shipment from factory: No connection of connector)

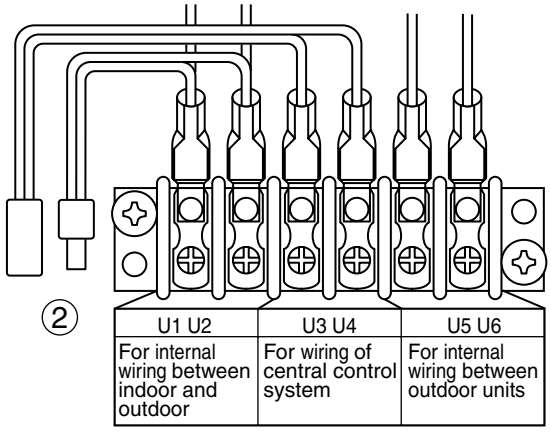
③ Turn on power of indoor/outdoor.
(In order of indoor → outdoor)

④ After approx. 1 minute, check that 7-segment display is U.1.L08 (U.1. flash) on the interface P.C. board of the header outdoor unit.

⑤ **Push SW15 and start setup the automatic address.**
(Max. 10 minutes for 1 line (Usually, approx. 5 minutes))

⑥ When the count Auto 1 → Auto 2 → Auto 3 is displayed in 7-segment display section, and it changes from U. 1. - - - (U. 1. flash) to U. 1. - - - (U. 1. light) , the setup finished.

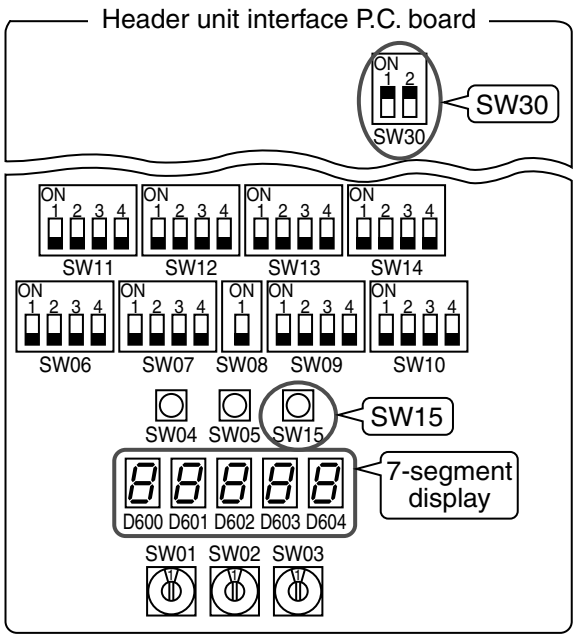
⑦ Procedure ④ to ⑥ are repeated in other refrigerant systems.



⑧ When address setup has finished in all the systems, turn off SW30-2 on the interface P.C. boards of the header outdoor units of the systems connected to the identical central control except a system with least address number.
(The end terminal resistances of the wires in the central control system of indoor/outdoor are unified.)

⑨ Connect the relay connector between [U1U2] and [U3U4] of the header outdoor unit for each refrigerant system.

⑩ Then set up the central control address.
(For the central control address setup, refer to the Installation manual of the central control devices.)



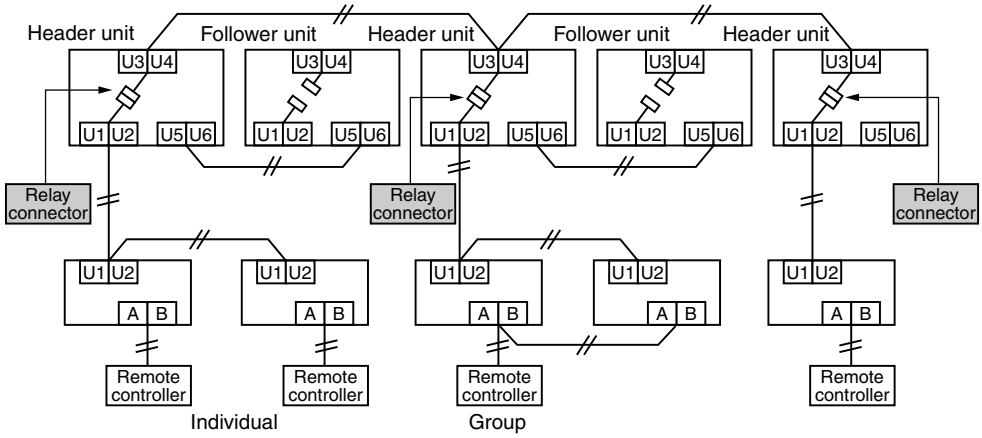
Switch setup

(Example in case of central control over refrigerant systems)

Outdoor side (Manual setup)

* Manual setup is necessary for column of which letter color is reversed.

Outdoor interface P.C. board	Header unit	Follower unit	Header unit	Follower unit	Header unit	Setup at shipment from factory
SW13, 14 (Line address)	1	(Setup is unnecessary.)	**2**	(Setup is unnecessary.)	**3**	1
SW30-2 (End terminal resistance of indoor/outdoor communi cation line/central control communication line)	ON	(Setup is unnecessary.)	**OFF after address setup**	(Setup is unnecessary.)	**OFF after address setup**	ON
Relay connector	**Short after address setup**	Open	**Short after address setup**	Open	**Short after address setup**	Open



Indoor side (Automatic setup)

Line address	1	1	2	2	3
Indoor unit address	1	2	1	2	1
Group address	0	0	1	2	0

CAUTION

For relay connector

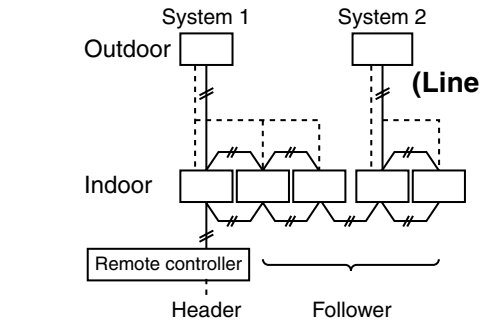
Never connect a relay connector until address setup for all the refrigerant lines finishes; otherwise address cannot be correctly set up.

2. Manual address setup from remote controller

In case to decide an address of the indoor unit prior to finish of indoor electric wiring work and unpracticed outdoor electric wiring work (Manual setup from wired remote controller)

Arrange indoor unit in which address is set up and the wired remote controller to 1 : 1.

(Cabling example in 2 systems)



Line address →	1	1	2	2
Indoor address →	1	2	3	1	2
Group address →	1	2	2	2	2

In the above example, under condition of no inter-unit wire of the wired remote controller, set the address after individual connecting of the wired remote controller.

Group address

Individual : 0000
Header indoor unit : 0001
Follower indoor unit : 0002
} In case of group control

Operation procedure

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** →
7 → ***8*** → ***9*** → ***10*** → ***11*** **End**

Turn on the power.

1 **Push simultaneously (SET) + (CL) + (🔧) buttons for 4 seconds or more.**
LCD changes to flashing.

2 **Using the setup temp. (▲) / (▼) buttons, set 12 to the item code.** **(Line address) →**

3 **Using the timer time (▲) / (▼) buttons, set up the line address.**
(Match it with the line address on the interface P.C. board of the header unit in the identical refrigerant system.)

4 **Push (SET) button.**
(OK when display goes on.)

(Indoor address) →

5 **Using the setup temp. (▲) / (▼) buttons, set 13 to the item code.**

6 **Using the timer time (▲) / (▼) buttons, set up the indoor address.**

7 **Push (SET) button.**
(OK when display goes on.)

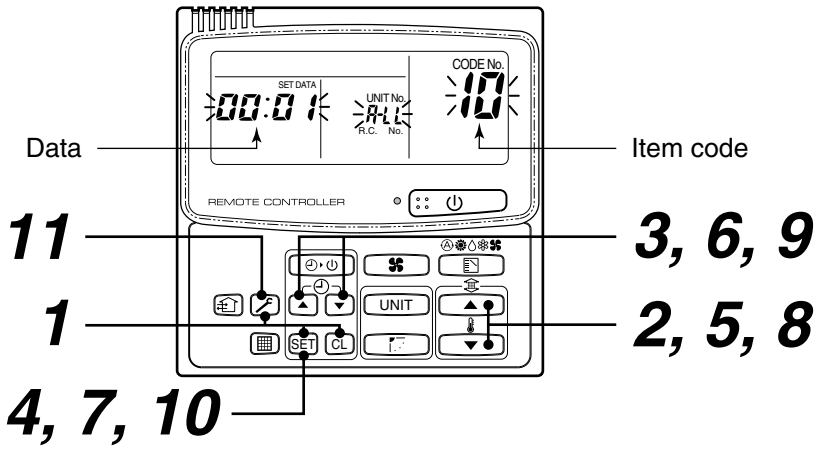
(Group address) →

8 **Using the setup temp. (▲) / (▼) buttons, set 14 to the item code.**

9 **Using the timer time (▲) / (▼) buttons, set Individual = 0000 , Header unit = 0001 , Follower unit = 0002 .**

10 **Push (SET) button.**
(OK when display goes on.)

11 **Push (🔧) button.**
Setup operation finished.
(Status returns to normal stop status.)



Note 1)

When setting the line address from the wired remote controller, do not use address **29** and **30**.

The address **29** and **30** cannot be set up in the outdoor unit. Therefore if they are incorrectly set up, a check code [**E04**] (Indoor/outdoor communication circuit error) is output.

Note 2)

When manual address has been set up from the wired remote controller, set up the following items for header outdoor unit of each system if performing a central control over refrigerant systems.

- Using SW13 and 14 on the interface P.C. board of the header unit in each system, set up the line address for each system.
- Turn off SW30-2 on the interface P.C. boards of the header outdoor units of the systems connected to the identical central control except a system with least line address number.
  (The terminator resistor of the cables in the central control system of indoor/outdoor are unified.)
- Connect the relay connector between [U1U2] and [U3U4] of the header outdoor unit for each refrigerant system.
- Then set up the central control address.
  (For the central control address setup, refer to the Installation manual of the central control devices.)

3. Confirmation of indoor address and the main unit position on the remote controller

[Confirmation of indoor unit No. and position]

1. When you want to know the indoor address though position of the indoor unit itself can be recognized;

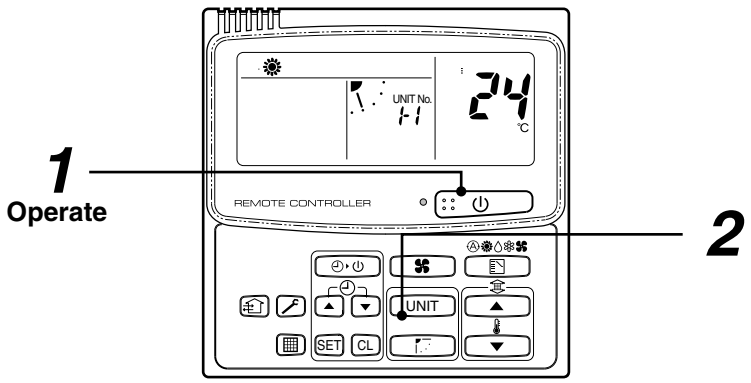
- **In case of individual operation (Wired remote controller : Indoor unit = 1 : 1) or group control**

<Procedure> (Operation while the air conditioner operates)

1 **If it stops, push** (⏻) **button.**

2 **Push** (UNIT) **button.**

The unit NO 1 - 1 is displayed on the LCD. (Disappears after several seconds) The displayed unit No indicates the line address and indoor address. (If there is other indoor unit connected to the same remote controller (Group control unit), other unit No is displayed every pushing (UNIT) button.)



Operation procedure

1 → ***2***

2. When you want to know position of the indoor unit using the address

- To confirm the unit numbers in a group control;

<Procedure> (Operation while the air conditioner stops)

The indoor unit numbers in a group control are successively displayed, and the corresponding indoor fan is turned on.

1 **Push [⌂] + [🔧] buttons simultaneously for 4 seconds or more.**

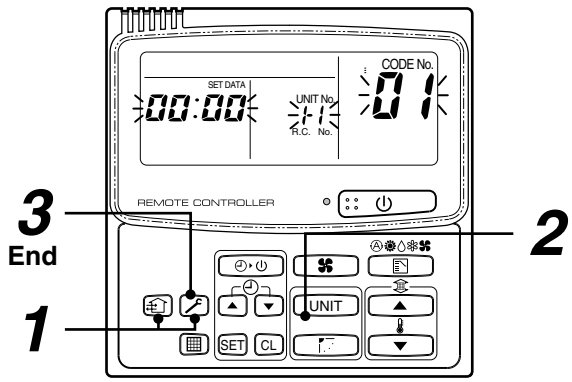
- Unit No ALL is displayed.
- The fans of all the indoor units in a group control are turned on.

2 **Every pushing [UNIT] button, the indoor unit numbers in the group control are successively displayed.**

- The firstly displayed unit No. on number indicates the address of the header indoor unit.
- Only fan of the selected indoor unit is turned on.

3 **Push [🔧] button to finish the procedure.**

All the indoor units in group control stop.



Operation procedure

1 → ***2*** → ***3*** **End**

• To confirm all the unit numbers from an arbitrary wired remote controller;

<Procedure> (Operation while the air conditioner stops)

The indoor unit No. and position in the same refrigerant system can be confirmed. An outdoor unit is selected, the indoor unit numbers in the same refrigerant system are successively displayed, and then its indoor unit fan is turned on.

1 **Push the timer time [▼] + [🔧] buttons simultaneously for 4 seconds or more.**

Firstly, the line 1, **item code** AC (Address Change) is displayed. (Select outdoor unit.)

2 **Using [UNIT] + [⌂] buttons, select the line address.**

3 **Using [SET] button, determine the selected line address.**

- The indoor address, which is connected to the refrigerant system of the selected outdoor unit is displayed and the fan is turned on.

4 **Every pushing [UNIT] button, the indoor unit numbers in the same refrigerant system are successively displayed.**

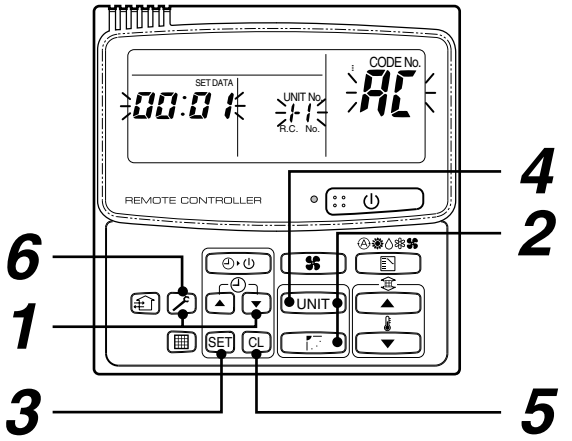
- Only fan of the selected indoor unit operates.

[To select another line address]

5 **Push [CL] button to return to procedure *2*.**

- The indoor address of another refrigerant system can be successively confirmed.

6 **Push [🔧] button to finish the procedure.**



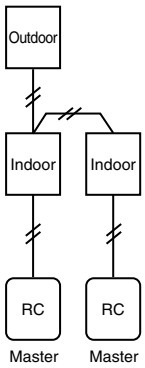
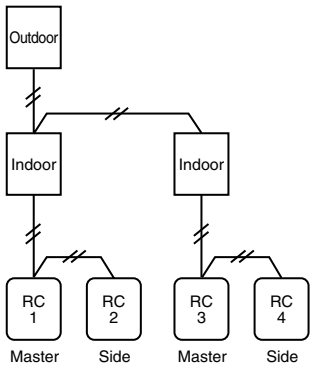
Operation procedure

1 → ***2*** → ***3*** →
4 → ***5*** → ***6*** **End**

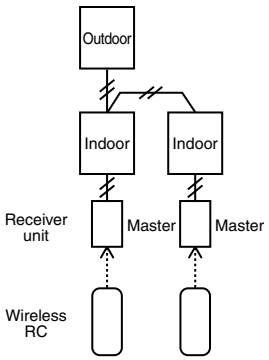
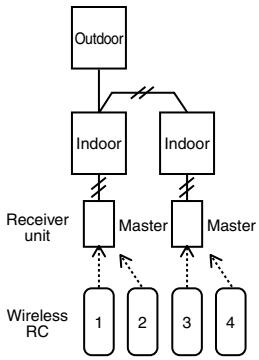
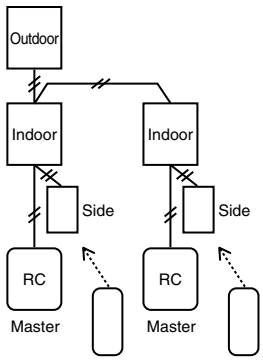
4. Address setup example (VRF system)

[Automatic address / Manual address setup example]

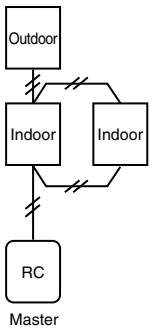
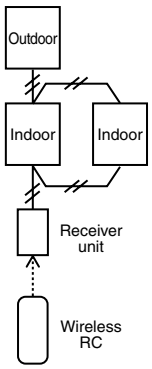
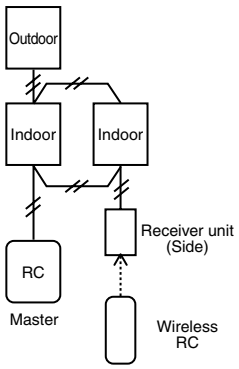
Individual control

Automatic address setting		Available		Available	
Outdoor	Line address	1		1	
					
Indoor	Line address	1	1	1	1
	Indoor unit address	1	2	1	2
	Group address	0	0	0	0

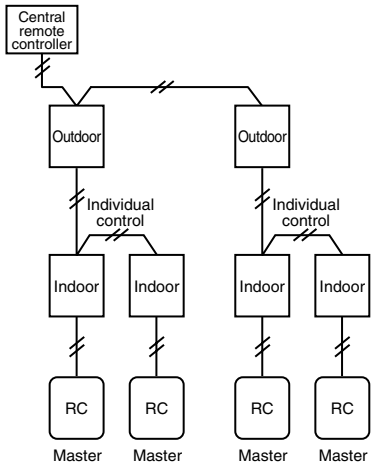
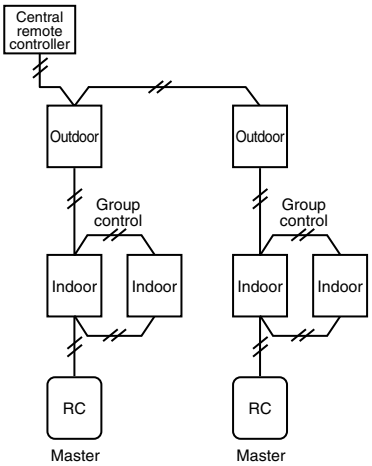
* RC: Remote Controller

Automatic address setting		Available		Available		Available	
Outdoor	Line address	1		1		1	
							
Indoor	Line address	1	1	1	1	1	1
	Indoor unit address	1	2	1	2	1	2
	Group address	0	0	0	0	0	0

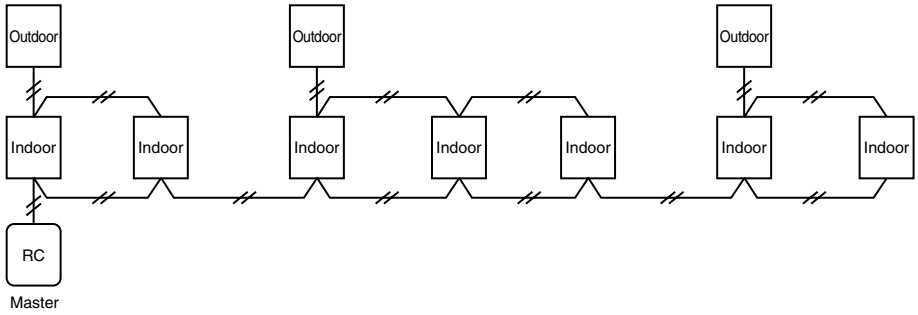
Group control

Automatic address setting		Available		Available		Available	
Outdoor	Line address	1		1		1	
							
Indoor	Line address	1	1	1	1	1	1
	Indoor unit address	1	2	1	2	1	2
	Group address	0	2	1	2	1	2

Central control (Multiple refrigerant systems)

Automatic address setting		Available				Available			
Outdoor	Line address	1		2		1		2	
									
Indoor	Line address	1	1	2	2	1	1	2	2
	Indoor unit address	1	2	1	2	1	2	1	2
	Group address	0	0	0	0	1	2	1	2

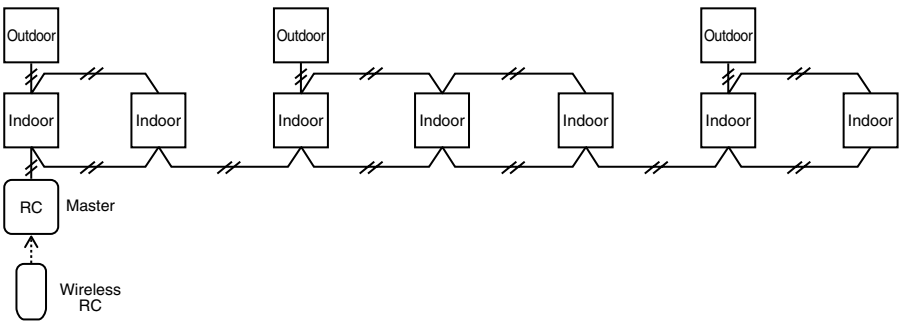
Group control over other refrigerant systems

Automatic address setting		Available						
Outdoor	Line address	1		2			1	
								
Indoor	Line address	1	1	2	2	2	3	3
	Indoor unit address	1	2	1	2	3	1	2
	Group address	1	2	2	2	2	2	2

*1 In case of group control over refrigerant systems, automatic address setting is available only when all indoor units connected to a group control are turned on during address setting.
If an automatic address setting is conducted under condition of power-ON only in the refrigerant system in which address set up, it will cause the error code “L03” (Duplicated header indoor units) because header indoor units exit for each refrigerant system. In this case, change the group address by the wired remote controller so that only one indoor unit becomes the header unit in one group control.

	Group address	1	2	1 → 2*	2	2	1 → 2*	2

→ It is necessary to change the group address as marked with * when an automatic address setting is conducted under condition of power-ON only in the refrigerant system in which address set up.

Automatic address setting		Available						
Outdoor	Line address	1		2			1	
								
Indoor	Line address	1	1	2	2	2	3	3
	Indoor unit address	1	2	1	2	3	1	2
	Group address	1	2	2	2	2	2	2

*1 In case of group control over refrigerant systems, automatic address setting is available only when all indoor units connected to a group control are turned on during address setting.
If an automatic address setting is conducted under condition of power-ON only in the refrigerant system in which address set up, it will cause the error code “L03” (Duplicated header indoor units) because header indoor units exit for each refrigerant system. In this case, change the group address by the wired remote controller so that only one indoor unit becomes the header unit in one group control.

	Group address	1	2	1 → 2*	2	2	1 → 2*	2

→ It is necessary to change the group address as marked with * when an automatic address setting is conducted under condition of power-ON only in the refrigerant system in which address set up.

5. Change of indoor address from wired remote controller

- **To change the indoor address in individual operation (Wired remote controller : Indoor unit = 1 : 1) or group control** (When the setup operation with automatic address has finished, this change is available.)

<Procedure> (Operation while air conditioner stops)

1 **Push simultaneously [SET] + [CL] + [🔧] buttons for 4 seconds or more.**
(The firstly displayed unit No. indicates the header indoor unit in group control.)

2 **In group control, select an indoor unit No to be changed by [UNIT] button.**
(The fan of the selected indoor unit is turned on.)

3 **Using the setup temp. [▲] / [▼] buttons, set 13 to the item code.**

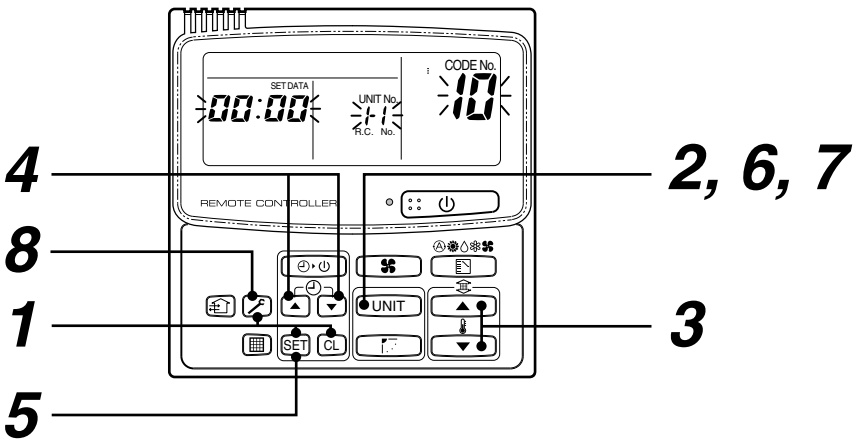
4 **Using the timer time [▲] / [▼] buttons, change the displayed setup data to a data which you want to change.**

5 **Push [SET] button.**

6 **Using the [UNIT] button, select the unit No. to be changed at the next time.**
Repeat the procedure 4 to 6 and change the indoor address so that it is not duplicated.

7 **After the above change, push [UNIT] button to confirm the changed contents.**

8 **If it is acceptable, push [🔧] button to finish confirmation.**



Operation procedure

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** → ***7*** → ***8*** **End**

- **To change all the indoor addresses from an arbitrary wired remote controller;**
  (When the setup operation with automatic address has finished, this change is available.)

Contents : Using an arbitrary wired remote controller, the indoor unit address can be changed for each same refrigerant cycle system

∗ Change the address in the address check/change mode.

<Procedure> (Operation while air conditioner stops)

1 **Push the timer time ▼ + 🔧 buttons simultaneously for 4 seconds or more.**
Firstly, the line 1, **item code** AC (Address Change) is displayed.

2 **Using UNIT + ⚑ buttons, select the line address.**

3 **Push SET button.**
- The indoor address, which is connected to the refrigerant system of the selected outdoor unit is displayed and the fan is turned on.

  First the current indoor address is displayed on the setup data. (Line address is not displayed.)

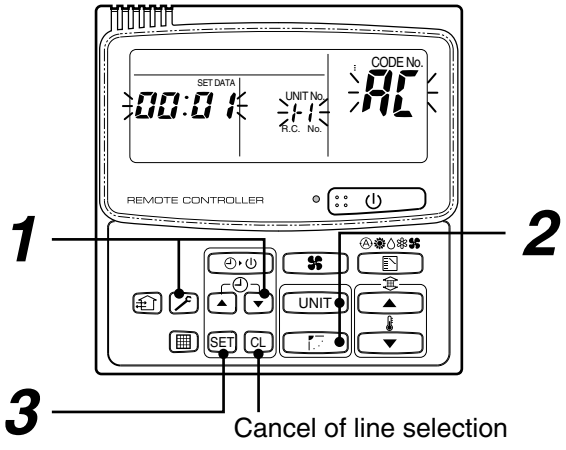
4 **The indoor address of the setup data moves up/down by the timer time ▲ / ▼ buttons.**
Change the setup data to a new address.

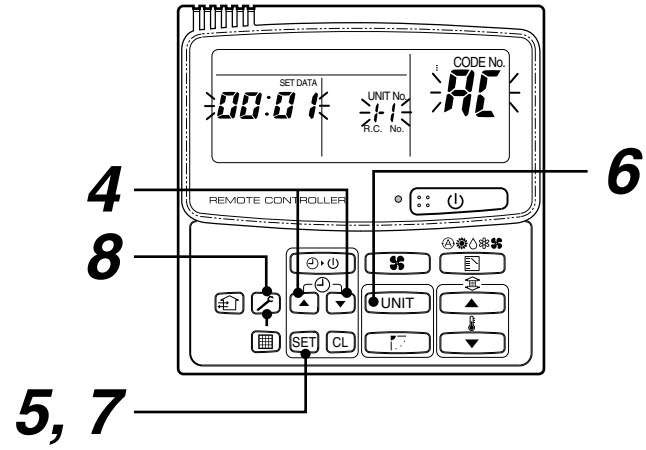
5 **Push SET button to determine the setup data.**

6 **Every pushing UNIT button, the indoor unit numbers in the same refrigerant system are successively displayed. Only fan of the selected indoor unit operates.**
Repeat the procedure ***4*** to ***6*** and change all the indoor addresses so that they are not duplicated.

7 **Push SET button.**
(All the displays on LCD go on.)

8 **Push 🔧 button to finish the procedure.**





Here, if the unit No. is not called up, the outdoor unit in this system does not exist.

Push CL button, and then select a line according to procedure ***2***.

Operation procedure

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** → ***7*** → ***8*** **End**

6. Clearance of address (Return to status (Address undecided) at shipment from factory)

Method 1

An address is individually cleared from a wired remote controller.

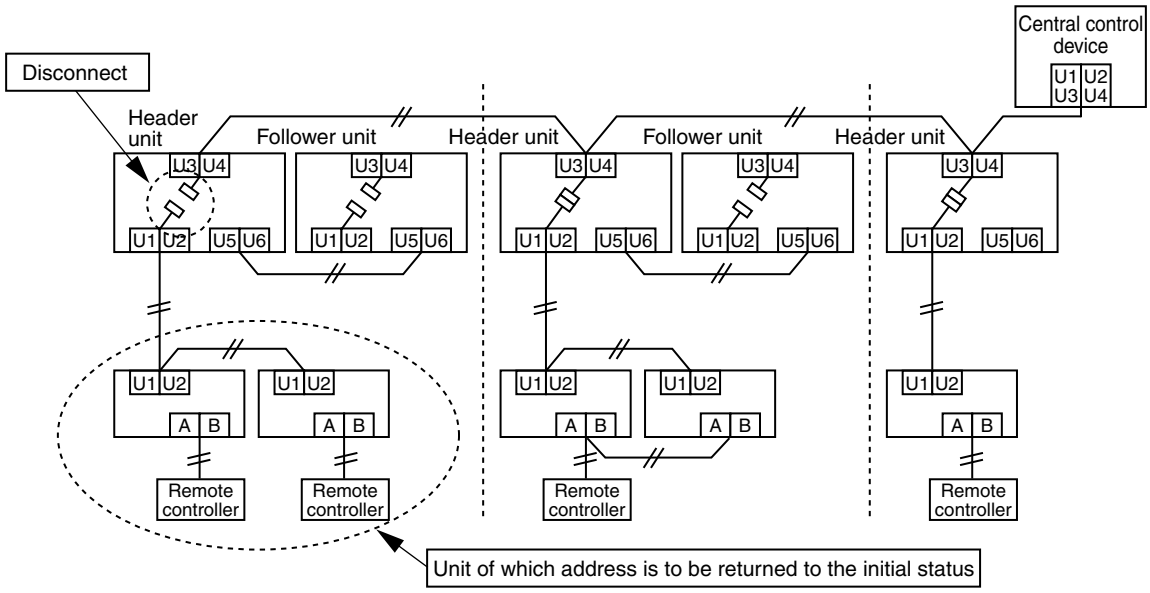
"**0099**" is set up to line address, indoor address, and group address data from the wired remote controller.

(For the setup procedure, refer to the above-mentioned address setup from the wired remote controller.)

Method 2

Clear the indoor addresses in the same refrigerant line from the outdoor unit.

1. Turn off the power of the refrigerant line to be returned to the status at shipment from factory, and change the header unit to the following status.
   1) Remove the relay connector between **[U1U2] and [U3U4]**.
      (If it has been already removed, leave it as it is.)
   2) Turn on SW30-2 on the interface P.C. board of the header unit if it is ON.
      (If it has been already ON, leave it as it is.)



2. Turn on the indoor/outdoor power of which address is to be cleared. After approx. 1 minute, check that "U.1. - - -" is displayed, and then execute the following operation on the interface P.C. board of the header unit of which address is to be cleared in the refrigerant cycle line.

SW01	SW02	SW03	SW04	Address which can be cleared
2	1	2	After checking that "A.d.buS" is displayed on 7-degment display, and then push SW04 for 5 seconds or more.	Line + Indoor + Group address
2	2	2	After checking that "A.d.nEt" is displayed on 7-degment display, and then push SW04 for 5 seconds or more.	Central address

3. After "A.d. c.L." has been displayed on 7-degment display, return SW01/SW02/SW03 to 1/1/1.
4. When the address clearing has correctly finished, "U.1.L08" is displayed on 7-degment display after a while. If "A.d. n.G." is displayed on 7-degment display, there is a possibility which is connected with the other refrigerant cycle line. Check again the relay connector between [U1U2] and [U3U4] terminals.

   NOTE) Be careful that the other refrigerant cycle line address may be also cleared if clearing operation is not correctly executed.
5. After clearing of the address, set up an address again.

7. In case of increase the address-undefined indoor units (Extension, etc.)

If set up the indoor address of which address is undefined accompanied with extension of indoor units, replacement of P.C. board, etc, follow to the methods below.

Method 1

Set up an address individually from a wired remote controller.

(Line address, Indoor address, Group address, Central address)

For the setup method, refer to the above “Manual address setup from remote controller”.

Method 2

Set up an address from the outdoor unit.

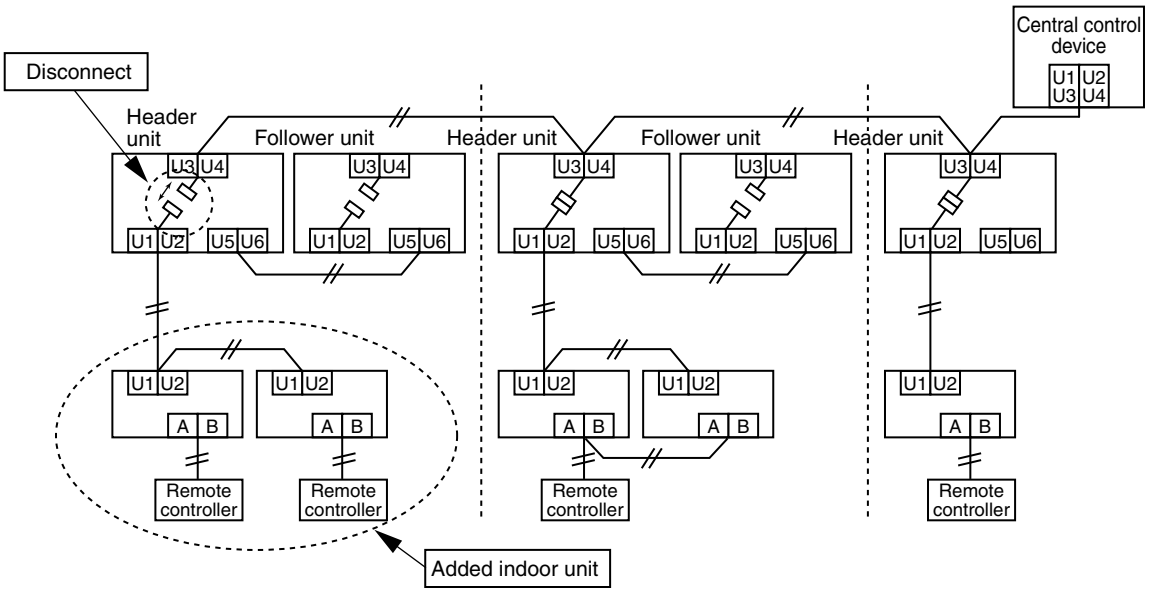
∗ Leave the address of the unit of which address has been already set up as it is.
Set up an address only to the unit of which address is undefined.

The addresses are allocated from the low number.

Setup procedure

Arrange the outdoor header units in the refrigerant line to which indoor units are added. (Figure below)

1. Remove the relay connector between [U1U2] and [U3U4].
2. Turn on SW30-2 on the interface P.C. board at outdoor header unit side if it is ON.
   ∗ Turn off the power, and then execute the operation.



3. Turn on the indoor/outdoor power of which address is to be set up. After approx. 1 minute, check that “U.1. - - -” is displayed on 7-segment display.
4. Execute the following operation on the interface P.C. board of the header unit.

SW01	SW02	SW03	SW04
2	14	2	After checking that “In.At” is displayed on 7-segment display, and then push SW04 for 5 seconds or more.

“AUTO1” → “AUTO2” → “AUTO3” … is counted and displayed on 7-degment display.

5. When “U.1. - - -” is displayed on 7-segment display, the setup operation finished.
   Turn off the indoor/outdoor power.
6. Return the following setup as before.
   - Relay connector
   - SW30-2
   - SW01, 02, 03

15. TEST OPERATION

Before test operation

⚠ WARNING

To protect the compressor at starting time, keep power-ON condition before 12 hours or more.

- Before turning on the power supply, carry out the following items.
  1) Using 500V-megger, check there is 1MΩ or more between the terminal block of the power supply and the earth. If 1MΩ or less is detected, do not run the unit.
  2) Check that all the valves of the outdoor unit are fully opened.
- Never push the electromagnetic contactor to carry out a forced test operation. (It is very dangerous because a protective device does not work.)

<Check list 1>

- Using the "Check list 1", check there is no trouble in the installation work.

Is capacity of the leak breaker appropriate?	Outdoor total capacity ☐ A	Header unit (A) ☐ A Follower unit (B) ☐ A Follower unit (C) ☐ A	Indoor unit ☐ A
Is diameter of the power cable correct?		Header unit (A) ☐ mm Follower unit (B) ☐ mm Follower unit (C) ☐ mm	Indoor unit ☐ mm
Is control communication line correct?		Indoor –outdoor connection terminals (U1, U2) ☐ Outdoor–outdoor connection terminals (U5, U6) ☐ Central control system connection terminals (U3, U4) ☐	
Is power of indoor units supplied collectively?			
Is earth grounded?			
Is insulation good?	☐ MΩ or more		
Is the main power voltage good?	☐ V		
Is diameter of connecting pipe correct?			
Is the branch kit correct?			
Is drain water of the indoor unit arranged so that it flows without accumulation?			
Is thermal insulation of pipes good? (Connecting pipes, Branch kit)			
Is not short-circuit of discharge air in indoor/outdoor units?			
After airtight test for pipes, are vacuuming and adding of refrigerant executed?			

Are valves of all the outdoor units fully opened?	Gas side	Liquid side	Balance side
Header unit (A)	☐	☐	☐
Follower unit (B)	☐	☐	☐
Follower unit (C)	☐	☐	☐

How to execute test operation

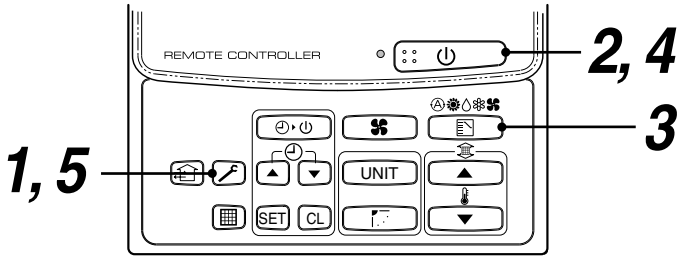
- To carry out a fan operation in a single indoor unit, turn off the power once, short CN72 on P.C. board, and then turn on the power again. (Start the unit in FAN mode.) In this case, do not forget to clear short-circuit of CN72 after test operation.
- Using the remote controller, check the operation in the usual operation. For the operation procedure, refer to the attached Owner's Manual.

  A forced test operation can be executed in the following procedure under condition of thermo-OFF of room temperature.

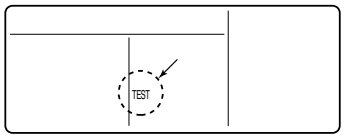
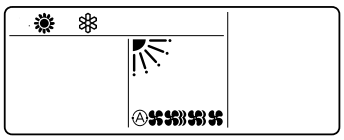
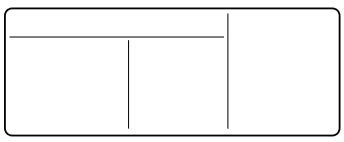
  In order to prevent a serial operation, the forced test operation is released after 60 minutes and returns to the usual operation.

NOTE

Do not use a forced operation in cases other than test operation because it applies an excessive load to the air conditioner.

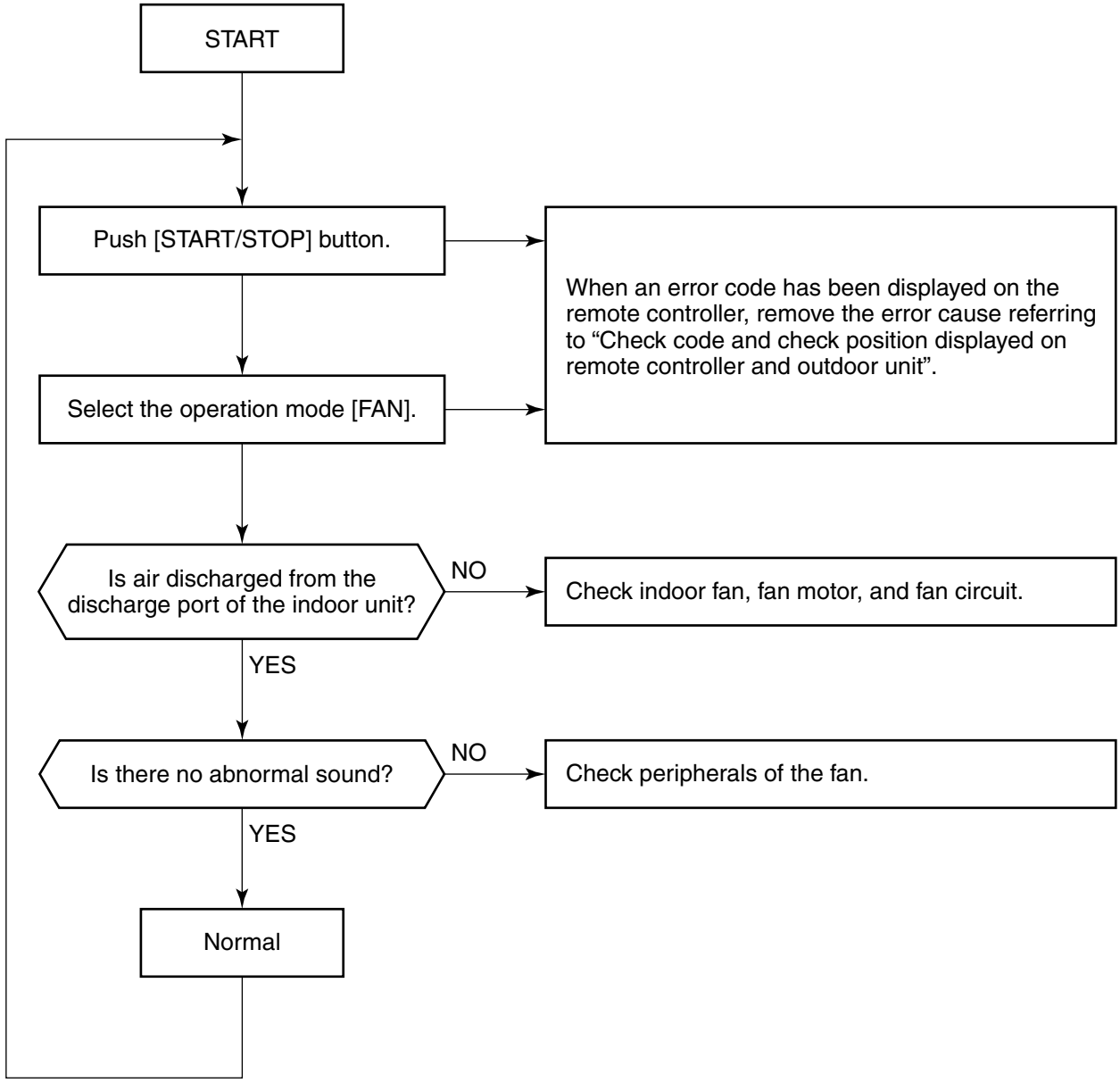


In case of wired remote controller

Procedure	Description	
1	Keep (🔧) button pushed for 4 seconds or more. [TEST] is displayed on the display part and the selection of mode in the test mode is permitted.	
2	Push (⏻) button.	
3	Using (▭) button, select the operation mode, [COOL] or [HEAT]. • Do not run the air conditioner in a mode other than [COOL] or [HEAT]. • The temperature controlling function does not work during test operation. • The detection of error is performed as usual.	
4	After the test operation, push (⏻) button to stop the operation. (Display part is same as procedure ***1***)	
5	Push (🔧) button to cancel (release from) the test operation mode. ([TEST] disappears on the display part and the status returns to a normal stop status.)	

15-1. Test Operation Check

15-1-1. Fan Check


START
Push [START/STOP] button.
When an error code has been displayed on the remote controller, remove the error cause referring to “Check code and check position displayed on remote controller and outdoor unit”.
Select the operation mode [FAN].
Is air discharged from the discharge port of the indoor unit?
NO
Check indoor fan, fan motor, and fan circuit.
YES
Is there no abnormal sound?
NO
Check peripherals of the fan.
YES
Normal

Check each indoor unit successively.

15-1-2. Cooling/Heating Test Operation Check

The cooling/heating test operation check can be performed on both remote controller and outdoor interface P.C. board.

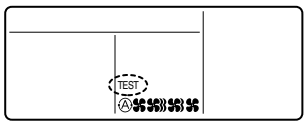
1. Test operation start/stop operation

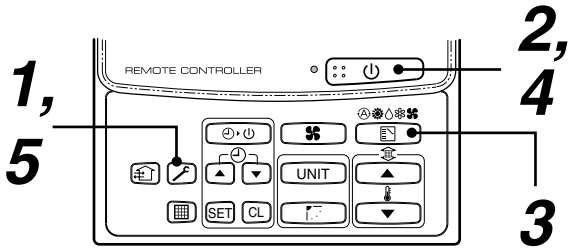
<Test operation from remote controller>

Wired remote controller : Refer to the lower items in “Test operation” of wired remote controller.
Wireless remote controller : Refer to the lower items in “Test operation” of wireless remote controller.

Wired remote controller

1 **When pushing [🔧] button for 4 seconds or more, [TEST] is displayed in the display section and the mode enters in test operation mode.**

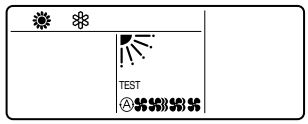




2 **Push [⏻] button.**

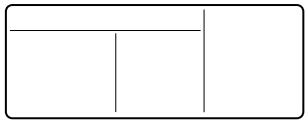
3 **Using [▭] button, select an operation mode [COOL] or [HEAT].**

- Do not use operation mode other than [COOL] or [HEAT].
- Temperature adjustment is unavailable during test operation.
- Error is detected as usual.



4 **When the test operation has finished, push [⏻] button to stop the operation.**
(The same display as that in procedure 1) appears in the display section.)

5 **Push [🔧] button to clear the test operation mode.**
([TEST] display in the display section disappears and the status returns to the normal stop status.)



Wireless remote controller
(Except 4-way Air Discharge Cassette type and Under Ceiling type)

1 **Remove the nameplate of the sensor section by inserting a minus screwdriver, etc into the notch at the bottom of the plate, and set the Dip switch to [TEST ON].**

2 **Execute a test operation with [⏻] button on the wireless remote controller.**

- ⏻, 🕘, and ❋ LED flash during test operation.
- Under status of [TEST RUN ON], the temperature adjustment from the wireless remote controller is invalid.

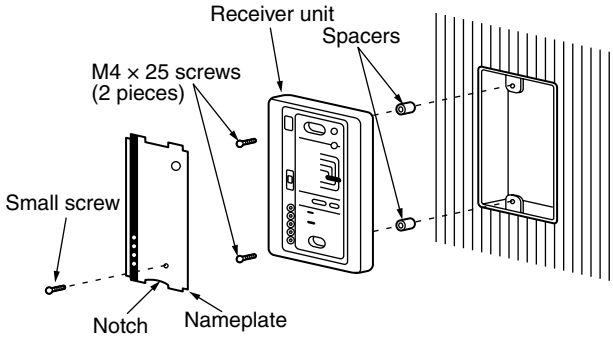
Do not use this method in the operation other than test operation because the equipment is damaged.

3 **Use either COOL or HEAT operation mode for a test operation.**

* The outdoor unit does not operate approx. 3 minutes after power-ON and operation stop.

4 **After the test operation finished, stop the air conditioner from the wireless remote controller, and return Dip switch of the sensor section as before.**

(A 60-minutes timer clearing function is attached to the sensor section in order to prevent a continuous test operation.)



Wireless remote controller (4-way Air Discharge Cassette type)

1 Turn off power of the air conditioner.

Remove the adjust corner cap attached with sensor section from the ceiling panel. For removing method, follow to the installation manual attached to the ceiling panel.
(Be careful to handle the sensor section because cables are connected to the sensor section.)

Remove the sensor cover from the adjust corner cap. (1 screw)

2 Change Bit [1: TEST] of the switch [S003] on the sensor P.C. board from OFF to ON.

Mount the sensor cover and attach the adjust corner cap with sensors to the ceiling panel.

Turn on power of the air conditioner.

3 Push button of the wireless remote controller, and select an operation mode [COOL] or [HEAT] with button. (All the display lamps of the wireless remote controller sensor section flash during the test operation.)

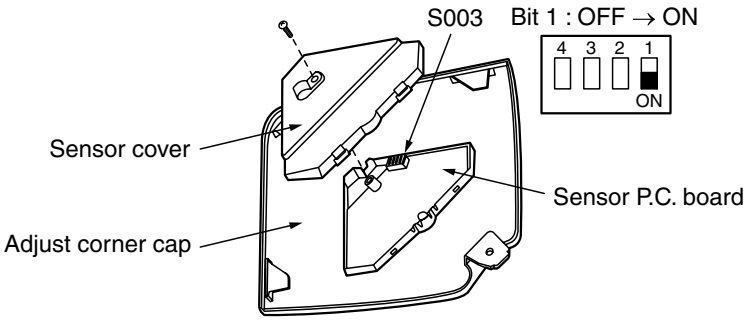
- Do not use operation mode other than [COOL] or [HEAT].
- Error is detected as usual.

4 When the test operation has finished, push button to stop the operation.

5 Turn off power of the air conditioner.

Change Bit [1] of the switch [S003] on the sensor P.C. board from ON to OFF.

Attach the adjust corner cap with sensors to the ceiling panel.



<Test operation from outdoor unit>

Refer to "**Function of Start/Stop the Indoor Unit from Outdoor Unit**" in "**Service Support Function**".

NOTE) The test operation returns to the normal operation after 60 minutes have passed.

In case of wireless remote controller

<table>
<tr><th>Procedure</th><th colspan="2">Description</th></tr>
<tr><td rowspan="2">1</td><td colspan="2">Turn on power of the air conditioner.</td></tr>
<tr><td colspan="2">The operation is not accepted for 5 minutes when power has been turned on at first time after installation, and 1 minute when power has been turned on at the next time and after. After the specified time has passed, perform a test operation.</td></tr>
<tr><td>2</td><td colspan="2">Push [Start/Stop] button and change the operation mode to [COOL] or [HEAT] with [Mode] button.
Then change the fan speed to [High] using [Fan] button.</td></tr>
<tr><td rowspan="2">3</td><td>Test cooling operation</td><td>Test heating operation</td></tr>
<tr><td>Set temperature to [18°C] using [Temperature set] button.</td><td>Set temperature to [30°C] using [Temperature set] button.</td></tr>
<tr><td>4</td><td>After checking the receiving sound “Pi”, immediately push [Temperature set] button to set to [19°C]</td><td>After checking the receiving sound “Pi”, immediately push [Temperature set] button to set to [29°C].</td></tr>
<tr><td>5</td><td>After checking the receiving sound “Pi”, immediately push [Temperature set] button to set to [18°C].</td><td>After checking the receiving sound “Pi”, immediately push [Temperature set] button to set to [30°C].</td></tr>
<tr><td>6</td><td colspan="2">Then repeat the procedure 4 → 5 → 4 → 5.
After approx. 10 seconds, all the display lamps on the sensor part of wireless remote controller, [Operation] (Green), [Timer] (Green), and [Ready] (Yellow) flash and the air conditioner starts operation.
If the lamps do not flash, repeat the procedure 2 and after.</td></tr>
<tr><td>7</td><td colspan="2">After the test operation, push [Start/Stop] button to stop the operation.</td></tr>
</table>

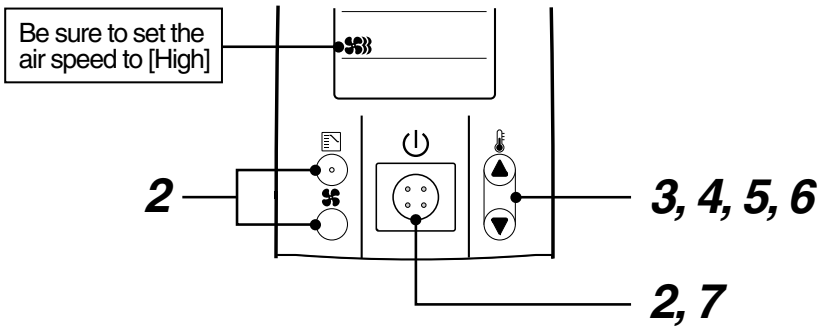
<Outline of test operation from the wireless remote controller>

Test cooling operation:

Start → 18°C → 19°C → 18°C → 19°C → 18°C → 19°C → 18°C → (Test operation) → Stop

Test heating operation:

Start → 30°C → 29°C → 30°C → 29°C → 30°C → 29°C → 30°C → (Test operation) → Stop



Wireless remote controller (High wall type 2 series)

REQUIREMENT

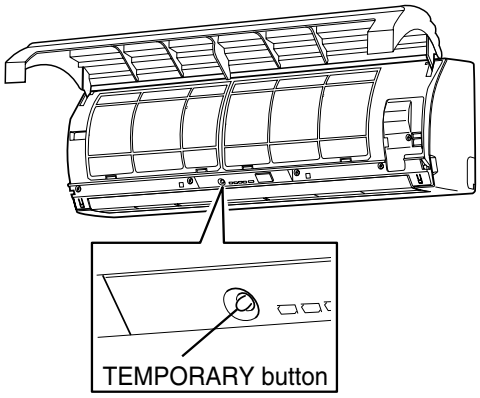
1. For the operation procedure, be sure to follow the Owner's Manual.
2. Finish the forced cooling operation in a short time because it applies excessive strength to the air conditioner.
3. A test operation of forced heating is unavailable. Perform a test operation by heating operation using the switches of the remote controller.
   However heating operation may be not carried out according to the temperature conditions.

• Check wiring/piping of indoor and outdoor units

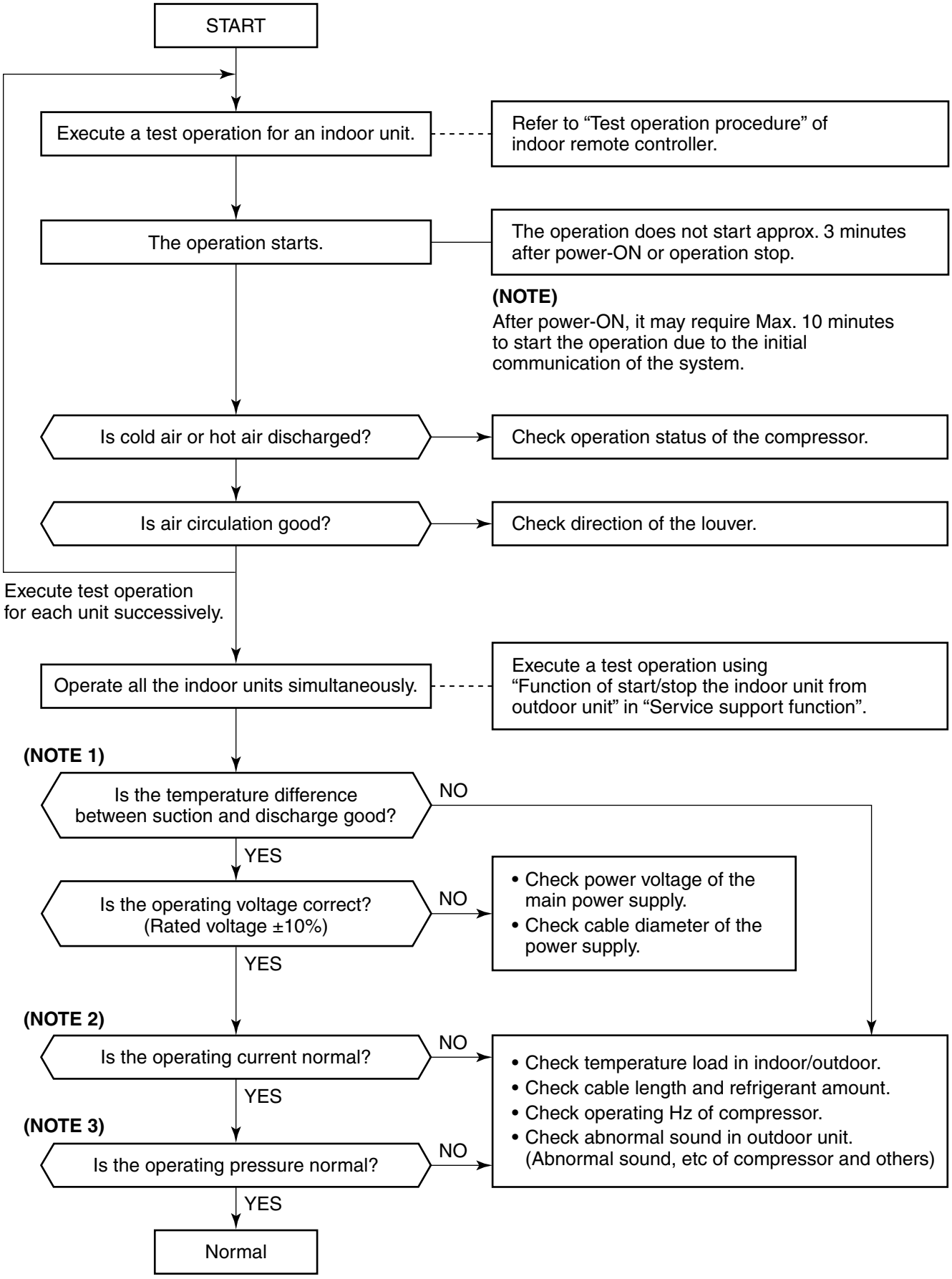
1. Open the front panel.
2. When pushing "TEMPORARY" button for 10 seconds or more, "Pi!" sound is heard and the operation changes to a forced cooling operation. After approx. 3 minutes, a cooling operation starts forcedly.
   Check cool air starts blowing. If the operation does not start, check wiring again.
3. To stop a test operation, push "TEMPORARY" button once again (Approx. 1 second).
   The up/down air flow adjusting plate closes and the operation stops.

• Check transmission of remote controller

1. Push "START/STOP" button of the remote controller to check an operation can also start by the remote controller.
   - When pushing "TEMPORARY" button once (For 1 second), the operation changes to automatic operation. For a forced cooling operation, keep the "TEMPORARY" button pushed over 10 seconds.
   - "Cooling" operation by the remote controller may be unavailable according to the temperature conditions. Check wiring/piping of the indoor and outdoor units in forced cooling operation.



2. Test operation


START
Execute a test operation for an indoor unit.
Refer to “Test operation procedure” of indoor remote controller.
The operation starts.
The operation does not start approx. 3 minutes after power-ON or operation stop.
(NOTE)
After power-ON, it may require Max. 10 minutes to start the operation due to the initial communication of the system.
Is cold air or hot air discharged?
Check operation status of the compressor.
Is air circulation good?
Check direction of the louver.
Execute test operation for each unit successively.
Operate all the indoor units simultaneously.
Execute a test operation using “Function of start/stop the indoor unit from outdoor unit” in “Service support function”.
(NOTE 1)
Is the temperature difference between suction and discharge good?
NO
YES
Is the operating voltage correct? (Rated voltage ±10%)
NO
• Check power voltage of the main power supply.
• Check cable diameter of the power supply.
YES
(NOTE 2)
Is the operating current normal?
NO
YES
(NOTE 3)
Is the operating pressure normal?
NO
• Check temperature load in indoor/outdoor.
• Check cable length and refrigerant amount.
• Check operating Hz of compressor.
• Check abnormal sound in outdoor unit. (Abnormal sound, etc of compressor and others)
YES
Normal

(NOTE 1) Criterion for difference between suction and discharge temperature

1. Cooling (All Cooling operation)

   After operation for minimum 30 minutes with [COOL] mode, if there is the dry bulb temperature difference △T: 8°C or more between suction port and discharge port of the indoor unit, it is normal.
   (In Max-Hz operation)

2. Heating (All Heating operation)

   After operation for minimum 30 minutes with [COOL] mode, if there is the dry bulb temperature difference △T: 15°C or more between suction port and discharge port of the indoor unit, it is normal.
   (In Max-Hz operation)

   * Consider that the temperature difference • ¢T may diminish in cases of system in which the connected indoor capacity exceeds 100%, a long pipe length, a large difference.

(NOTE 2) Criterion for operating power current

For a test operation (All the indoor units operate), it is normal when the power current is under the following values.

Outdoor unit	8HP	10HP	12HP
Current value	18	21	22

(Unit: A)

(NOTE 3) Criterion for cycle status

1. Refrigerating cycle under standard condition

   The refrigerating cycle under standard cooling and heating condition is as follows:

			10HP MMY-MAP1002FT8	
			All cooling standard	**All heating standard**
Pressure (MPa)	High	(Pd)	3.1	2.9
	Low	(Ps)	0.8	0.7
Pipe surface temp (°C)	Discharge	(TD)	86	90
	Suction	(TS1)	6	3
	Indoor heat exchanger	(TC)	8	46
	Outdoor heat exchanger	(TE1)	43	1
	Liquid temp	(TL)	36	36
COMP operation rotation count (rps)	Compressor	1	79	75
	Compressor	2	79	75
Air temp condition (DB/WB) (°C)	Indoor		27/19	20/–
	Outdoor		35/–	7/6

* This compressor is driven with 4-pole motor. The value of the compressor frequency (Hz) measured by a clamp meter is two times of the rotation count (rps) of the compressor.
* This data is the cycle data under condition of the standard pipe length and two 4-way Air Discharge Cassette type air conditioners connected. Data changes according to installed pipe length, combination of indoor units, or connected indoor capacity.
* For a compressor, the left side is 1 and the right side is 2 viewed from the front side.
  Even if two compressors operate, the frequency difference may be a little set as measures against resonance.
* The temperature of indoor heat exchanger (TC) indicates TCJ sensor temperature in cooling time, and TC2 sensor temperature in heating time respectively.

2. Criterion for operating pressure

   General criterion is as follows:

Cooling	High pressure : 2.0 to 3.2MPa	Indoor :18 to 32°C	When all the units operate in cooling mode
	Low pressure : 0.5 to 0.9MPa	Outdoor :25 to 35°C	
Heating	High pressure : 2.5 to 3.3MPa	AIndoor :15 to 25°C	When all the units operate in heating mode
	Low pressure : 0.5 to 0.7MPa	Outdoor : 5 to 10°C	

Using the rotary switch on the outdoor unit I/F, the operating pressure, cycle temperature, and compressor rotation count can be checked on 7-segment display.
Refer to “Outdoor cycle data display” and “Indoor cycle data display” in “**Support function in test operation**”.

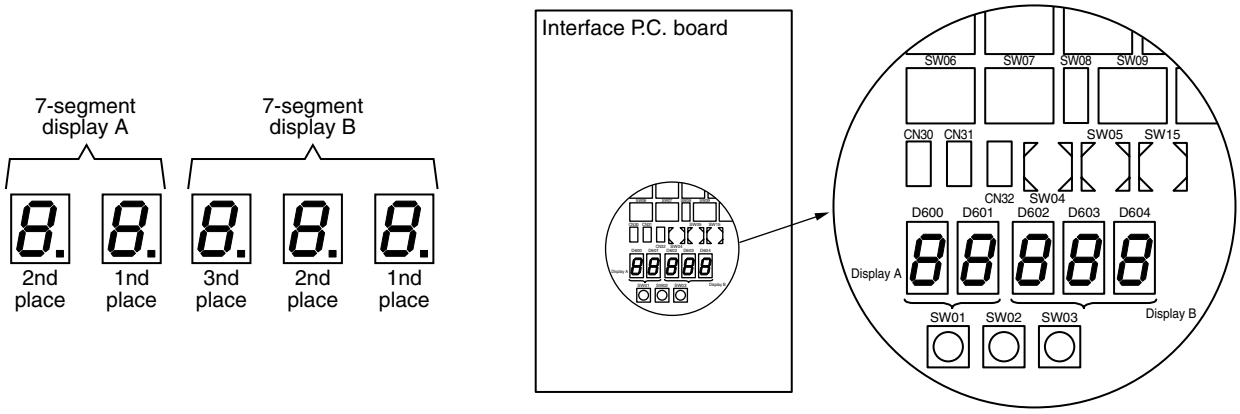
16. SUPPORT FUNCTION IN TEST OPERATION

16-1. 7-segment display function of outdoor unit (I/F P.C. board)

■ 7-segment display on the outdoor unit (Interface P.C. board)

On the interface control P.C. board, 7-segment LED to check the operating status is provided on the control P.C. board.

The displayed contents are exchanged by combining the setup numbers of the rotary switches (SW01, SW02, and SW03) on P.C. board.



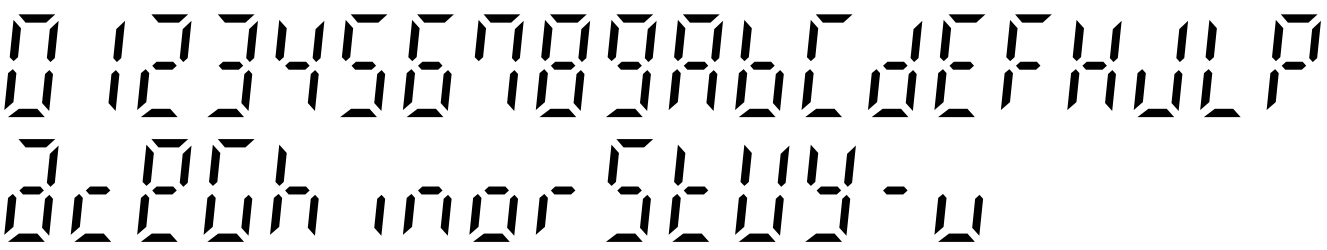
◆ **Check procedure when stop with trouble occurred**

When the system stopped due to a trouble of the outdoor unit, execute a check in the following procedure.

1. Open panel of the outdoor unit, and then check the 7-segment display.
   The check code is displayed at the right side of 7-segment display.
   [U1] [○○○] ([○○○]: Check code)
   * Switch setup when confirming the check code: SW01 [1], SW02 [1], SW03 [1]
     However the check code [○○○] is displayed for 3 seconds and the sub-code [○○○] for 1 second are alternately displayed if an sub-code is provided.
2. Confirm the check code, and then perform the check operation based on the procedure of each check code diagnosis.
3. Perform the check operation based on the procedure of each check code diagnosis.

How to read the check monitor

<7-segment display>



1. System information data display (Displayed on the header outdoor unit only)

SW01	SW02	SW03	Display contents				
1	1	3	Used refrigerant	Displays type of used refrigerant.		A	B
				Model with refrigerant R410A		r4	10A
				Model with refrigerant R407C		r4	07C
	2		System capacity	A	[8] to [30] : 8 to 30HP		
				B	[HP]		
	4		No. of connected indoor units/ No. of units with cooling thermo ON	A	[0] to [48] : 0 to 16 units (No. of connected units)		
				B	[C0] to [C48] : 0 to 16 units (No. of units with cooling thermo ON)		
	5		No. of connected indoor units/ No. of units with heating thermo ON	A	[0] to [48] : 0 to 16 units (No. of connected units)		
				B	[H0] to [H48] : 0 to 16 units (No. of units with heating thermo ON)		
	6		Compressor command correction amount	A	Data is displayed with hexadecimal notation		
				B			
	7		Release control	A	Normal time : [r], During release control: [r1]		
				B	—		
	8		Oil-equation control	A	Normal time : [oiL-0]		
				B	During oil equation : [oiL-1]		
	9		Oil-equalization request	A	Displays with segment LED lighting pattern		
				B	Display A / Display B A, F, G, B, E, C, D, Dp U2 U3 F in the left figure goes on: Header requests oil equalization. C in the left figure goes on: Follower requests oil-equalization. (Outdoor unit number)		
	10		Refrigerant oil recovery operation	A	During sending of cooling refrigerant oil recovery signal : [C1]. Normal time : [C]		
				B	During sending of heating refrigerant oil recovery signal : [H1]. Normal time : [H]		
	11		Automatic address	A	[Ad]		
				B	Automatic addressing : [FF], Normal time : [ ]		
	12		Demand operation	A	[dU]		
				B	Normal time : [ ]. In 50% to 90% : [50 to 90] When controlling by BUS line input : [E50 to E90]		
	13		Option control (P.C. board input)	Displays option control status		A	B
				Operation mode selection : Normal time		h.*	*.*.*.
					Heating only	H.*	*.*.*.
					Cooling only	C.*	*.*.*.
				Batch start/stop : Normal time		*.···.	*.*.*.
					Start input	*.1.	*.*.*.
					Stop input	*.0.	*.*.*.
				Night low-noise operation : Normal time		*.*.	···.*.*.
					Operation input	*.*.	1.*.*.
				Snowfall fan operation : Normal time		*.*.	*.···.*.
					Operation input	*.*.	*.1.*.
	14		Option control (BUS line input)		Same as above		
	15		Unused				
	16		—	A	—		
				B	—		

2. Outdoor unit information data display (Displayed on each outdoor unit)

SW01	SW02	SW03	Display contents				
1	1	1	Error data	A	Displays outdoor unit number: [U1] to [U3]		
				B	Displays check code (Latest code only is displayed.) There is no check code: [– – –] There is auxiliary code: Check code [∗ ∗ ∗] for 3 seconds, auxiliary code [– ∗ ∗] for 1 second alternately		
			<SW04> push function: Fan of unit with error only drives. 7-segment A: [E1] <SW04 + SW05> push function: Fan of normal unit only drives. 7-segment A: [E0] <SW05> push function: Interruption of fan operation function				
	2		—	A	—		
				B	—		
	3		Operation mode	A	Stop: [ ] All cooling: [C], All heating: [H], Normal defrost: [J] Mainly cooling, partly heating [Ch] Mainly heating, partly cooling [Hc]		
				B	—		
	4		Outdoor unit HP	A	8HP: [8], 10HP: [10], 12HP: [12]		
				B	[HP]		
	5		Compressor operation command	A	No.1 compressor operation command is displayed. Data display with HEX: [00 to FF]		
				B	No.2 compressor operation command is displayed. Data display with HEX: [00 to FF]		
				<SW04> push function: Inverter frequency is exchanged to decimal notation. 7-segment display (A/B): [∗ ∗ ∗ ∗ H] (Normal display by pushing <SW05>)			
	6		Outdoor fan mode	A	[FP]		
				B	Mode 0 to 31: [0 to 31]		
	7		Compressor backup	A	Displays No.1 compressor setup status Normal time: [ ], Backup setup: [C1]		
				B	Displays No.2 compressor setup status Normal time: [ ], Backup setup: [C2]		
	8		—	A	—		
				B	—		
	9		Control valve output data	Displays control output status of solenoid valve		A	B
				4-way valve: ON / 4-way valve 2: OFF		H. 1	··· ··· ···
				4-way valve: OFF / 4-way valve 2: ON		H. 0	··· ··· ···
	10			SV2: ON / SV5: OFF		2. 1	··· 5. 0
				SV2: OFF / SV5: ON		2. 0	··· 5. 1
	11			SV3A: ON / SV3B: OFF / SV3C: OFF /SV3D: OFF		3. 1	0 0 0
				SV3A: OFF / SV3B: ON / SV3C: OFF /SV3D: OFF		3. 0	1 0 0
				SV3A: OFF / SV3B: OFF / SV3C: ON /SV3D: OFF		3. 0	0 1 0
				SV3A: OFF / SV3B: OFF / SV3C: OFF /SV3D: ON		3. 0	0 0 1
	12			SV41: ON / SV42: OFF		4. ···	1 0 ···
				SV41: OFF / SV42: ON		4. ···	0 1 ···
	13			SV11: ON / SV12: OFF		1. ···	1 0 ···
				SV11: OFF / SV12: ON		1. ···	0 1 ···
	14		PMV1 /PMV2 opening	Displays opening data (Decimal) (Total opening)		∗ ∗	∗ ∗. P
	15		PMV3 opening	Displays opening data (Decimal)		··· ∗	∗ ∗. P
	16		Oil level judgment status	A	[oL] <SW05> push SW function: 2 seconds, The following data is displayed. * During determination of shortage in compressor 1: [L ···], during determination of shortage in compressor 2: [··· L]		
				B	Initial display: [··· ··· ···], Oil level judgment result: [A. #. ∗] Judgment result of compressor 1 in [#], compressor 2 in [∗] (0: Correct, 1, 2: Shortage) is displayed.		

3. Outdoor cycle data display (Displayed on each outdoor unit)

SW01	SW02	SW03	Display contents					
1	1	2	Pd pressure data	Pd pressure (MPaG) is displayed with decimal data. (MPaG: Approx. 1/10 value of kg/cm²G data)			A	B
							P d.	∗.∗∗
	2		Ps pressure data	Ps pressure (MPaG) is displayed with decimal data.			P S.	∗.∗∗
	4		TD1 sensor data	Temperature sensor data (°C) is displayed with decimal notation. • Symbol display for 1 sec. and data display for 3 sec. are alternately exchanged. • Data is displayed in [∗]. • Negative data is displayed as [– ∗ ∗ ∗].		Symbol	t d	1
						Data	∗	∗∗.∗
	5		TD2 sensor data			Symbol	t d	2
						Data	∗	∗∗.∗
	6		TS1 sensor data			Symbol	t S	1
						Data	∗	∗∗.∗
	7		TS2 sensor data			Symbol	t S	2
						Data	∗	∗∗.∗
	8		TE sensor data			Symbol	tE	
						Data	∗	∗∗.∗
	9		TL sensor data			Symbol	t L	
						Data	∗	∗∗.∗
	10		TO sensor data			Symbol	t o	
						Data	∗	∗∗.∗
	11		TK1 sensor data			Symbol	F 1	
						Data	∗	∗∗.∗
	12		TK2 sensor data			Symbol	F 2	
						Data	∗	∗∗.∗
	13		TK3 sensor data			Symbol	F 3	
						Data	∗	∗∗.∗
	14		TK4 sensor data			Symbol	F 4	
						Data	∗	∗∗.∗
	15		—	A	—			
				B	—			
	16		—	A	—			
				B				

4. Data display of follower outdoor cycle (Displayed on the header unit)

∗ This method is used when information of the follower unit is displayed on 7-segment display of the header unit.

SW01	SW02	SW03	Display contents		
3	1	1 to 2	Error data	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	Check code is displayed. (Latest check code only) No check code: [– – –]
	2		Installed compressor type	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	
	3		Outdoor unit capacity	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	8HP: [··· ··· 8]. 10HP: [··· 1 0], 8 to 12HP
	4		Compressor operation command	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	No.1 compressor ON: [C10], No.2 compressor ON: [C01] For unconnected compressor, " – " is displayed.
	5		Fan operation mode	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	Stop time: [F ··· 0], Mode 31: [F 3 1]
	6		Release signal	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	Normal time: [r ··· ···], Release received: [r ··· 1]
	7		Oil level judgment	A	[U. ∗] ∗: SW03 setup number + 1 number (Outdoor unit number U2 to U3)
				B	Normal time: [··· ··· ···], Oil shortage: [··· ··· L]

NOTE) The follower unit is setup by changing SW03.

SW03	1	2
7-segment display A	U2	U3

5. Indoor unit information data display (Displayed on the header oudoor unit only)

SW01	SW02	SW03	Display contents		
4	1 to 16	1 to 3	Receiving status of indoor BUS communication	B	Receiving time: [··· ··· 1], Not received: [··· ··· ···]
5			Indoor check code	B	No check code: [– – –]
6			Indoor horse power	B	0. 2, 0. 5, 0. 8, ··· 1, 1. 2, 1. 7, ··· 2, 2. 5, ··· 3, 3. 2, ··· 4, ··· 5, ··· 6, ··· 8, 1 0, 1 6, 2 0
7			Indoor request command (S code)	B	Data is displayed with HEX. Heating [H ··· 0 to H ··· F] Cooling [C ··· 0 to C ··· F]
8			Indoor PMV opening data	B	Data is displayed with Hexadecimal notation.
9			Indoor TA sensor data	B	Data is displayed with Hexadecimal notation.
10			Indoor TF sensor data	B	Data is displayed with Hexadecimal notation.
11			Indoor TCJ sensor data	B	Data is displayed with Hexadecimal notation.
12			Indoor TC1 sensor data	B	Data is displayed with Hexadecimal notation.
13			Indoor TC2 sensor data	B	Data is displayed with Hexadecimal notation.

NOTE) Indoor address No. is set up by exchanging SW02 and SW03.

SW03	SW02	Indoor address	7-segment display A
1	1 to 16	SW02 setup number	[01] to [16]
2	1 to 16	SW02 setup number + 16	[17] to [32]
3	1 to 16	SW02 setup number + 32	[33] to [48]

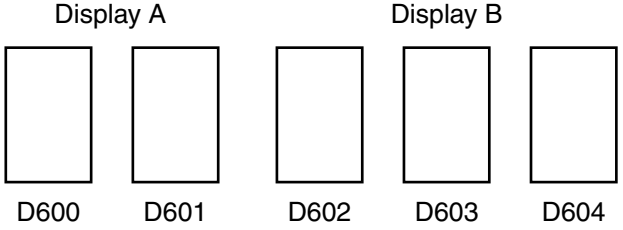
6. Outdoor EEPROM write-in error code display (Displayed on the header outdoor unit only)

∗ The latest error code written in EEPROM of each outdoor unit is displayed.
(It is used when confirming the error code after power supply has been reset.)

Set SW01 to 03 as shown in the following table, and the push SW04 for 5 seconds or more to display an error code.

SW01	SW02	SW03	Display contents	7-segment display	
				A	B
1	1	16	The latest error code of the header unit (U1)	E. r	1. – –
	2		The latest error code of the followewr unit 1 (U2)	E. r	2. – –
	3		The latest error code of the followewr unit 2 (U3)	E. r	3. – –

- **7-segment display A, B**



16-2. Service Support Function

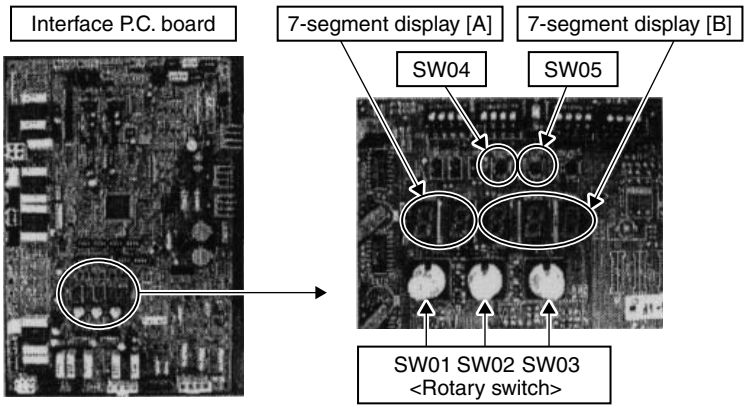
16-2-1. Function to Start/Stop (ON/OFF) Indoor Unit from Outdoor Unit

The following functions of the indoor unit can start or stop by operation of the switches on the interface P.C. board of the outdoor unit.

No.	Function	Outline	Setup/Release	7-segment display
1	Cooling test operation	Changes the mode of all the connected indoor units collectively to cooling test operation. **Note)** Control operation same as usual test operation from remote control is performed.	**[Setup]** Push SW04 for 2 seconds or more with SW01"2", SW02"5", SW03"1". **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [C] [–C]
2	Heating test operation	Changes the mode of all the connected indoor units collectively to heating test operation. **Note)** Control operation same as usual test operation from remote control is performed.	**[Setup]** Push SW04 for 2 seconds or more with SW01"2", SW02"6", SW03"1". **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [H] [–H]
3	Batch start	Starts all the connected indoor units collectively. **Note)** The contents follow to the setup of remote controller.	**[Setup]** Push SW04 for 2 seconds or more with SW01"2", SW02"7", SW03"1". **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [CH] [11] [11] is displayed on Section B for 5 seconds.
	Batch stop	Stops all the connected indoor units collectively.	**[Setup]** Push SW05 for 2 seconds or more with SW01"2", SW02"7", SW03"1". **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [CH] [00] [00] is displayed on Section B for 5 seconds.
4	Individual start	Starts the specified indoor unit. **Notes)** • The contents follow to the setup of remote controller. • The other indoor units keep the status as they are.	**[Setup]** Set SW01 "16" and set SW02 and SW03 to address No. (1 to 64) to be started, and then push SW04 for 2 seconds or more **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [ ] [ ] **Section A:** Displays the corresponding indoor address. **Section B:** Displays [11] for 5 seconds from operation-ON.
	Individual stop	Stops the specified indoor unit. **Note)** The other indoor units keep the status as they are.	**[Setup]** Set SW01 "16" and set SW02 and SW03 to address No. (1 to 64) to be stopped, and then push SW05 for 2 seconds or more **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [ ] [ ] **Section A:** Displays the corresponding indoor address. **Section B:** Displays [00] for 5 seconds from operation-OFF.
	Individual test operation	Operates the specified indoor unit. **Note)** The other indoor units keep the status as they are.	**[Setup]** Set SW01 "16" and set SW02 and SW03 to address No. (1 to 64) to be operated, and then push SW04 for 10 seconds or more **[Release]** Return SW01, SW02, Sw03 to "1".	**Section A** **Section B** [ ] [ ] **Section A:** Displays the corresponding indoor address. **Section B:** Displays [FF] for 5 seconds from test operation-ON.

NOTE 1) This start/stop function only sends the signals from the outdoor unit to the indoor unit, such as start, stop, operation mode, etc, but it does not resend the signals even if the indoor unit does not follow the sent signals.

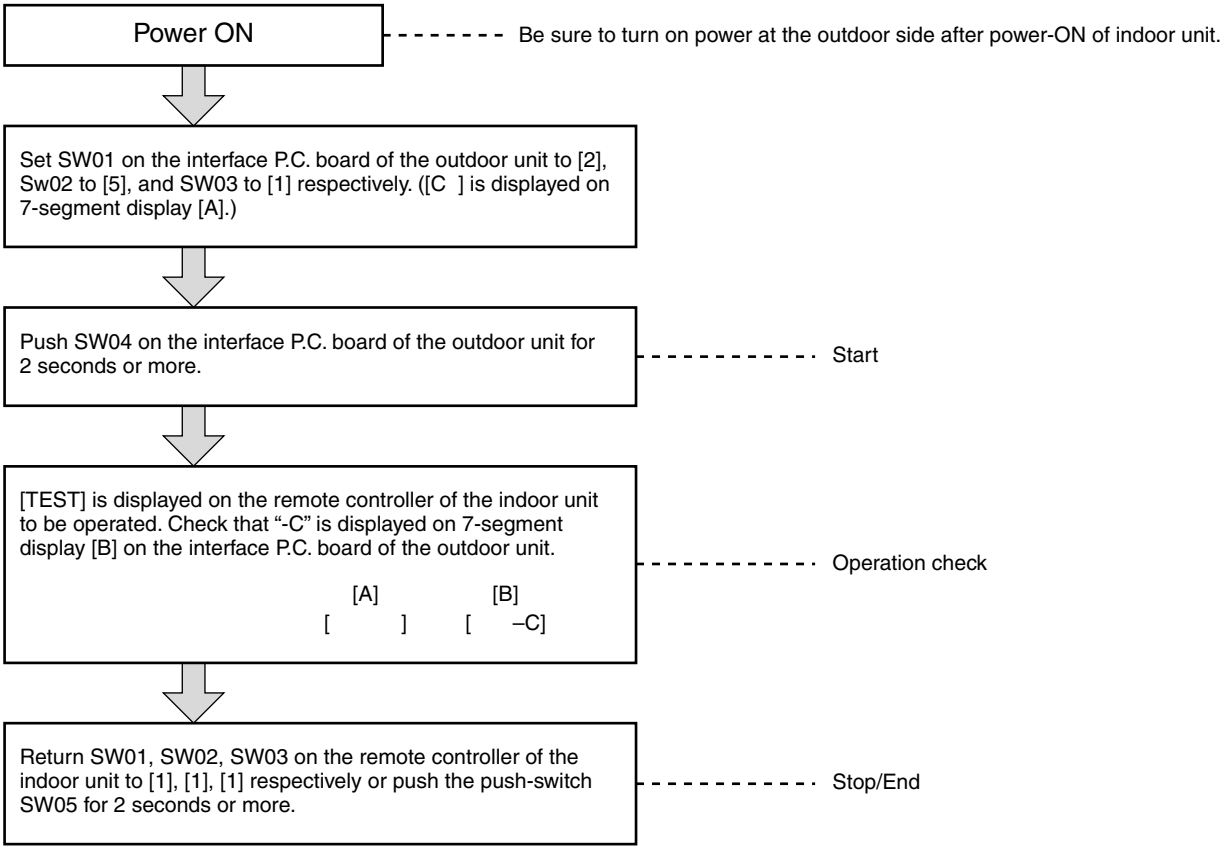
NOTE 2) The above controls are not used during abnormal stop.

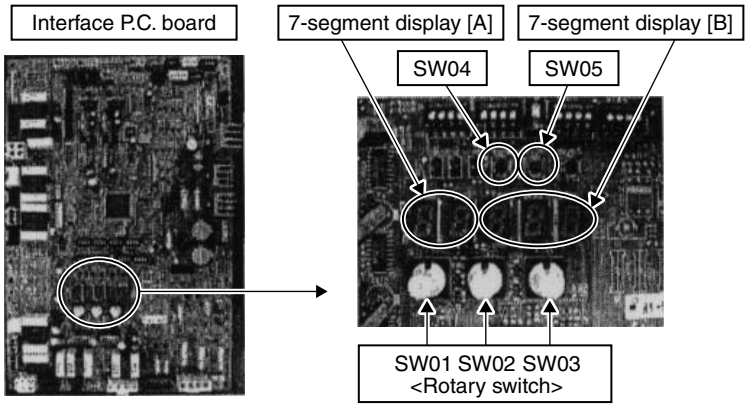


1. All cooling test operation function

This function is provided to change collectively the mode of all the indoor units connected to the same system to the cooling test operation mode by using switches on the interface board of the outdoor unit.

<Operation procedure>


Power ON
Be sure to turn on power at the outdoor side after power-ON of indoor unit.
Set SW01 on the interface P.C. board of the outdoor unit to [2], Sw02 to [5], and SW03 to [1] respectively. ([C] is displayed on 7-segment display [A].)
Push SW04 on the interface P.C. board of the outdoor unit for 2 seconds or more.
Start
[TEST] is displayed on the remote controller of the indoor unit to be operated. Check that "-C" is displayed on 7-segment display [B] on the interface P.C. board of the outdoor unit.
[A] [B]
[ ] [–C]
Operation check
Return SW01, SW02, SW03 on the remote controller of the indoor unit to [1], [1], [1] respectively or push the push-switch SW05 for 2 seconds or more.
Stop/End

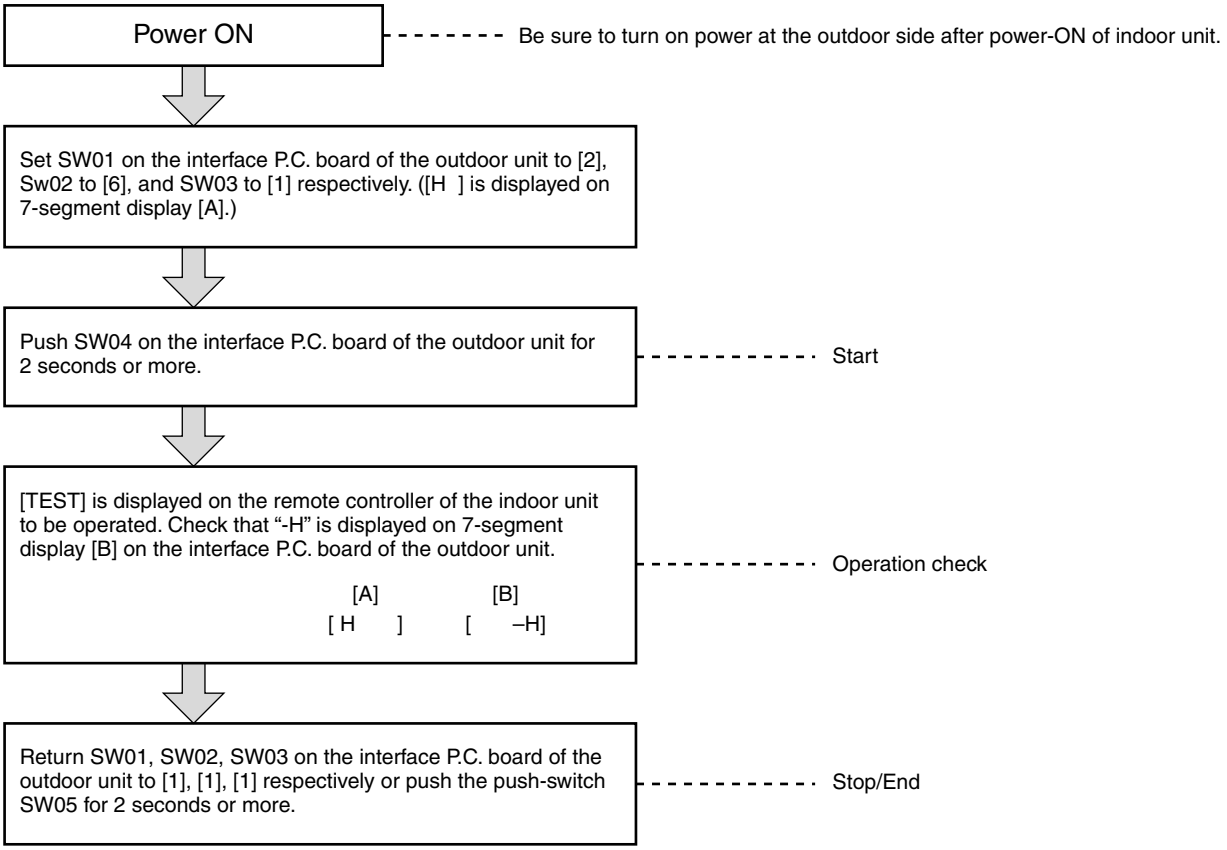


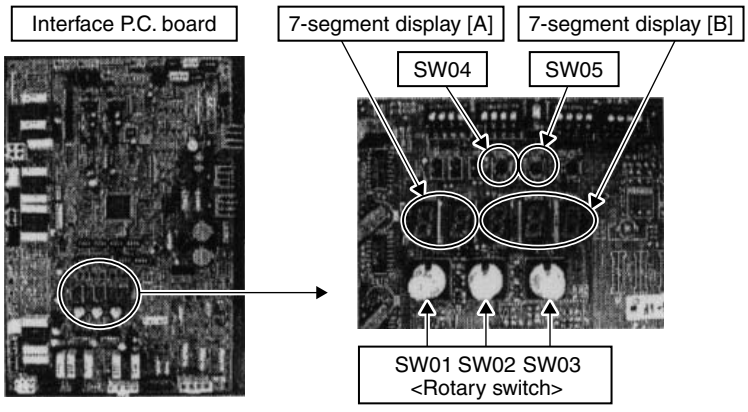
NOTE) The test operation returns to the normal operation after 60 minutes.

2. All heating test operation function

This function is provided to change collectively the mode of all the indoor units connected to the same system to the heating test operation mode by using switches on the interface board of the outdoor unit.

<Operation procedure>


Power ON
Be sure to turn on power at the outdoor side after power-ON of indoor unit.
Set SW01 on the interface P.C. board of the outdoor unit to [2], Sw02 to [6], and SW03 to [1] respectively. ([H] is displayed on 7-segment display [A].)
Push SW04 on the interface P.C. board of the outdoor unit for 2 seconds or more.
Start
[TEST] is displayed on the remote controller of the indoor unit to be operated. Check that "-H" is displayed on 7-segment display [B] on the interface P.C. board of the outdoor unit.
[A] [B]
[H] [–H]
Operation check
Return SW01, SW02, SW03 on the interface P.C. board of the outdoor unit to [1], [1], [1] respectively or push the push-switch SW05 for 2 seconds or more.
Stop/End

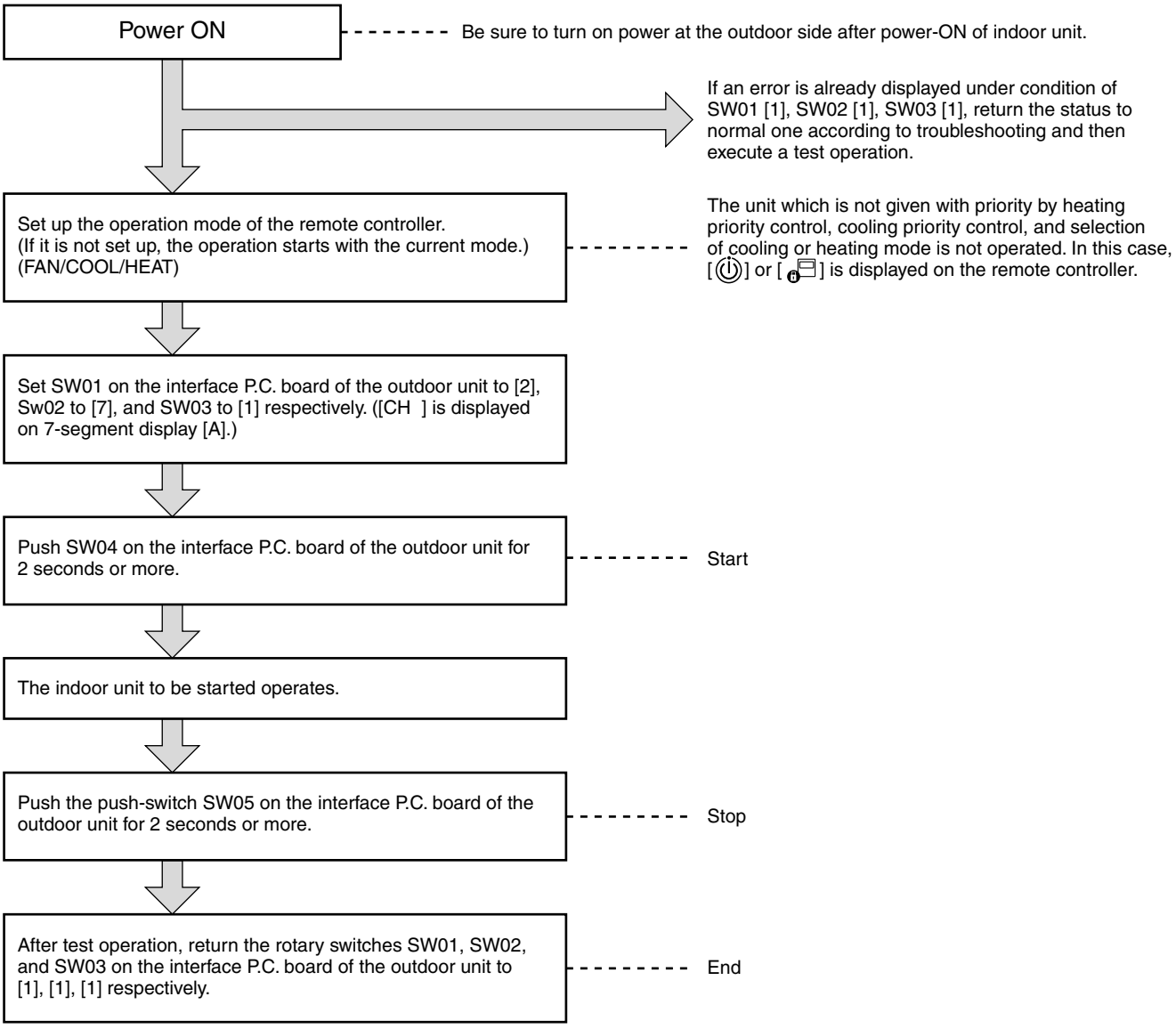


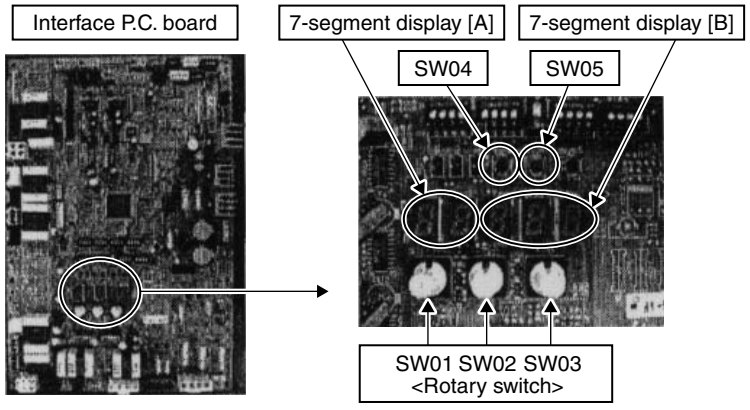
NOTE) The test operation returns to the normal operation after 60 minutes.
Even if outdoor temperature exceeds 21°C, all heating test operation can be performed.

3. Batch start/stop (ON/OFF) function

This function is provided to start/stop collectively all the indoor units connected to the same system by using switches on the interface board of the outdoor unit.

<Operation procedure>


Power ON
Be sure to turn on power at the outdoor side after power-ON of indoor unit.
If an error is already displayed under condition of SW01 [1], SW02 [1], SW03 [1], return the status to normal one according to troubleshooting and then execute a test operation.
Set up the operation mode of the remote controller.
(If it is not set up, the operation starts with the current mode.)
(FAN/COOL/HEAT)
The unit which is not given with priority by heating priority control, cooling priority control, and selection of cooling or heating mode is not operated. In this case, [ ] or [ ] is displayed on the remote controller.
Set SW01 on the interface P.C. board of the outdoor unit to [2], Sw02 to [7], and SW03 to [1] respectively. ([CH] is displayed on 7-segment display [A].)
Push SW04 on the interface P.C. board of the outdoor unit for 2 seconds or more.
Start
The indoor unit to be started operates.
Push the push-switch SW05 on the interface P.C. board of the outdoor unit for 2 seconds or more.
Stop
After test operation, return the rotary switches SW01, SW02, and SW03 on the interface P.C. board of the outdoor unit to [1], [1], [1] respectively.
End



4. Individual start/stop (ON/OFF) individual test operation function

This function is provided to start/stop (ON/OFF) individually each indoor unit connected to the same system by using switches on the interface board of the outdoor unit.

Set SW01 [16] and set SW02 and SW03 to indoor address No. (1 to 64) to be started (Refer to the following table*) - only the setup indoor unit starts operation.

(In the rotary switches of the indoor unit which operates in a group by the remote controller, the follower indoor unit cannot be individually started or stopped. In this case, [--] is displayed on 7-segment display [B] on the interface P.C. board of the outdoor unit.)

<Operation procedure>

Power ON

Be sure to turn on power at the outdoor side after power-ON of indoor unit.

If an error is already displayed under condition of SW01 [1], SW02 [1], SW03 [1], return the status to normal one according to troubleshooting and then execute a test operation.

Set up the operation mode of the remote controller.
(If it is not set up, the operation starts with the current mode.)

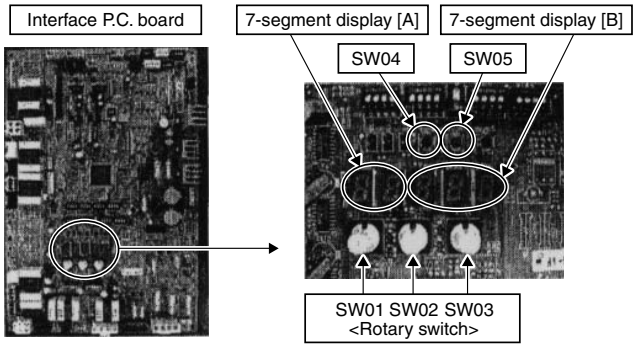
The unit which is not given with priority by heating priority control, cooling priority control, and selection of cooling or heating mode is not operated. In this case, [⏻] or [ ] is displayed on the remote controller.

Match the rotary switch on the interface P.C. board of the outdoor unit * with in the following table.

(7-segment display)

[A] [ ] ↑ Address display of corresponding indoor unit

[B] [ ] ↑ [00] is displayed for 5 seconds after operation-ON.



Push the push-switch SW04 on the interface P.C. board of the outdoor unit for 2 seconds or more.
(If pushing this switch continuously for 10 seconds or more, the operation changes to the individual test operation.)

(7-segment display)

[A] [ ] ↑ Address display of corresponding indoor unit

[B] [ ] ↑ [11] is displayed for 5 seconds after operation-ON.
(For individual test operation,[FF] is displayed.)

Start

The indoor unit to be started operates.

Push the push-switch SW05 on the interface P.C. board of the outdoor unit for 2 seconds or more.

(7-segment display)

[A] [ ] ↑ Address display of corresponding indoor unit

[B] [ ] ↑ [00] is displayed for 5 seconds after operation-ON.

After test operation, return the display select switches SW01, SW02, and SW03 on the interface P.C. board of the outdoor unit to [1], [1], [1] respectively.

End

*

SW01	SW02	SW03	Units to be operated
16	1 to 16	1	Address 1 to Address 16 } individually
16	1 to 16	2	Address 17 to Address 32 } individually
16	1 to 16	3	Address 33 to Address 48 } individually
16	1 to 16	4	Address 49 to Address 64 } individually

In individual start/stop

NOTE) The individual test operation returns to the normal operation after 60 minutes.

5. Error Clearing Function

[1] Clearing from the main remote controller

[Error clearing in outdoor unit]

Error of the outdoor unit is cleared by the unit of one refrigerant circuit system to which the indoor units operated by the remote controller. (Error of the indoor unit is not cleared.)

For clearing errors, the service monitor function of the remote controller is used.

<Method>

1 **Change the mode to service monitor mode by pushing [CL] + [🔧] buttons simultaneously for 4 seconds or more.**

2 **Using [▲] / [▼] buttons, set "FF" to item code.**

The display in Section A in the following figure is counted with interval of 5 seconds as "0005" → "0004" → "0003" → "0002" → "0001" → "0000".

When the count arrives "0000", the error is cleared.

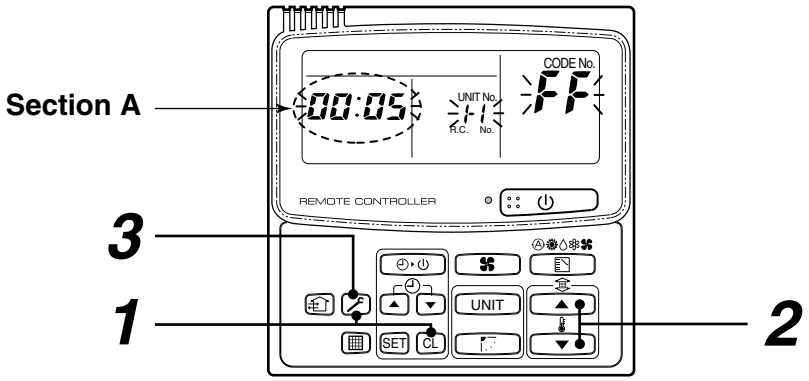
∗ However, counting from "0005" is repeated on the display.

3 **When [🔧] button is pushed, the status returns to the normal status.**

Operation procedure

1 → ***2*** → ***3***

The status returns to the normal status.



[Error clearing in indoor unit]

Error in the indoor unit is cleared by [⏻] button on the remote controller.

(Only error of the indoor unit connected with operating remote controller is cleared.)

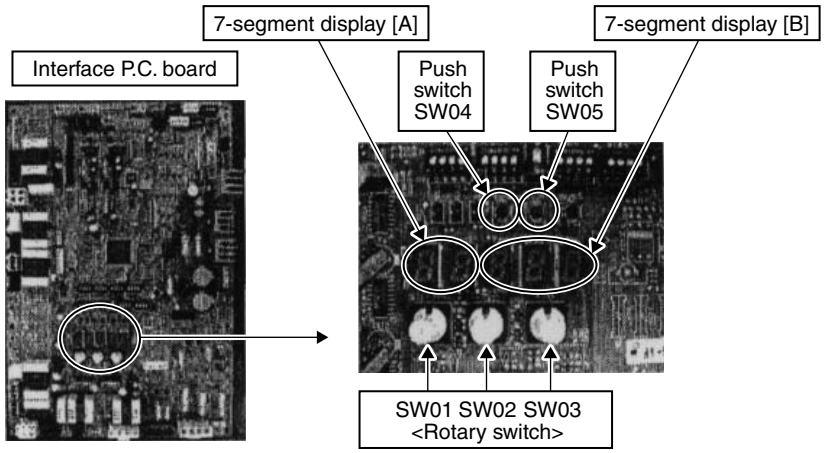
[2] Clearing from the interface P.C. board

Using the switches on the interface P.C. board, this function is to clear the currently detected error for each refrigerant circuit system without resetting the power supply.

(→ Restart of error detection)

Errors in both outdoor and indoor units are once cleared.

Set the rotary switches on the interface P.C. board of the header unit to the following setting. SW01=[2] SW02=[16] SW03=[1]	**(7-segment display)** [A] [B] [Er] [ ]
Push the push-switch SW04 on the interface P.C. board of the header unit for 5 seconds or more.	
[CL] is displayed in 7-segment display [B] on the P.C. board (for 5 seconds), and the error is completely cleared.	**(7-segment display)** [A] [B] [Er] [CL]



[3] Clearing of error check code by power reset

This function is provided to clear error in a refrigerant circuit system by resetting the power of all the outdoor and the indoor units.

(→ Restart of error detection)

As same as the clearing method on the interface P.C. board, errors of both the outdoor and the indoor units are once cleared.

<Method>

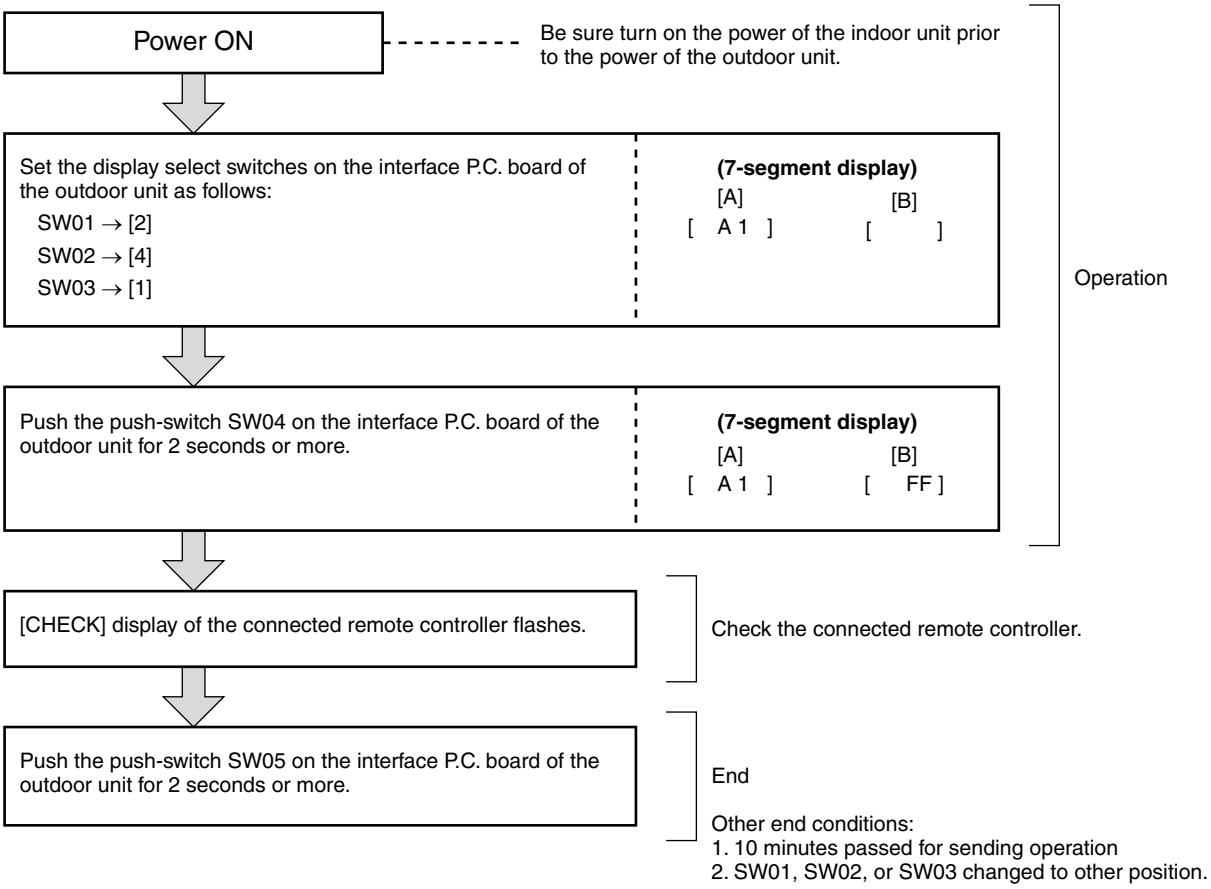
1. Be sure to reset power of both the outdoor and the indoor units.
2. Turn on the power of the indoor unit prior to the power of the outdoor unit.
   (If the power is turned on in reverse order, a check code [E19] is output.)

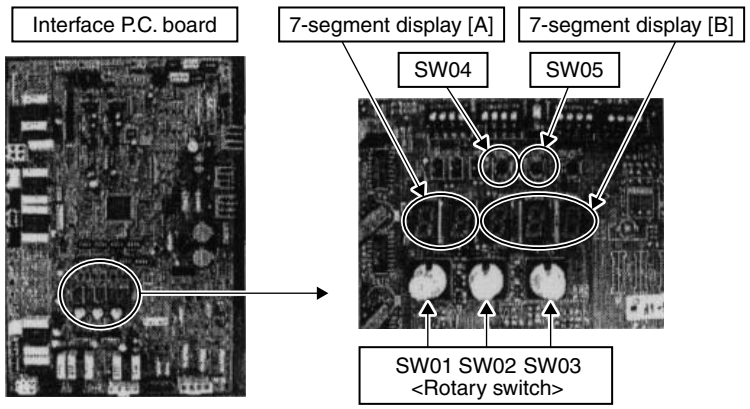
NOTE) After power reset, it requires usually 3 minutes to power-on due to the initial communication of the system. In same cases, it requires Max. 10 minutes.

16-2-2. Remote Controller Distinction Function

This function is provided to distinguish the remote controller connected from the outdoor unit to the indoor unit for a refrigerant system using switches on the interface P.C. board of the outdoor unit.

<Distinction procedure>


Power ON
Be sure turn on the power of the indoor unit prior to the power of the outdoor unit.
Set the display select switches on the interface P.C. board of the outdoor unit as follows:
SW01 → [2]
SW02 → [4]
SW03 → [1]
(7-segment display)
[A] [B]
[A 1] [ ]
Push the push-switch SW04 on the interface P.C. board of the outdoor unit for 2 seconds or more.
(7-segment display)
[A] [B]
[A 1] [FF]
Operation
[CHECK] display of the connected remote controller flashes.
Check the connected remote controller.
Push the push-switch SW05 on the interface P.C. board of the outdoor unit for 2 seconds or more.
End
Other end conditions:
1. 10 minutes passed for sending operation
2. SW01, SW02, or SW03 changed to other position.



16-2-3. Pulse Motor Valve (PMV) Forced Open/Close Function in Indoor Unit

This function is provided to open or close forcedly PMV for 2 minutes in all the indoor units by the switch operation on the interface P.C. board of the outdoor unit.

After then, it is also used to open PMV fully when turning off the power and executing an operation.

<Operation>

[Open fully]

Set the switch SW01 on the interface P.C. board of the outdoor unit to [2], SW02 to [3], SW03 to [1], and push SW04 for 2 seconds or more.

(Display appears on 7-segment display for 2 minutes as follows.)

[P] [FF]

[Close fully]

Set the switch SW01 on the interface P.C. board of the outdoor unit to [2], SW02 to [3], SW03 to [1], and push SW05 for 2 seconds or more.

(Display appears on 7-segment display as follows.)

[P] [00]

[Clear]

After 2 minutes (1 minutes for “Close fully”) passed when setup has finished, the opening automatically returns to the normal opening.

16-2-4. Pulse Motor Valve (PMV) Forced Open Fully/Close fully Function in Outdoor Unit

This function is provided to forcedly open or close fully Pulse Motor Valve (PMV1/PMV2 and PMV3) used in the outdoor unit for 2 minutes.

[PMV selection]

By setting SW12-1, PMV which you want to operate can be selected.

SW12 bit 1	OFF	PMV1/PMV2
	ON	PMV3

[Open fully]

Short-circuit for CN30 on the outdoor interface P.C. board.

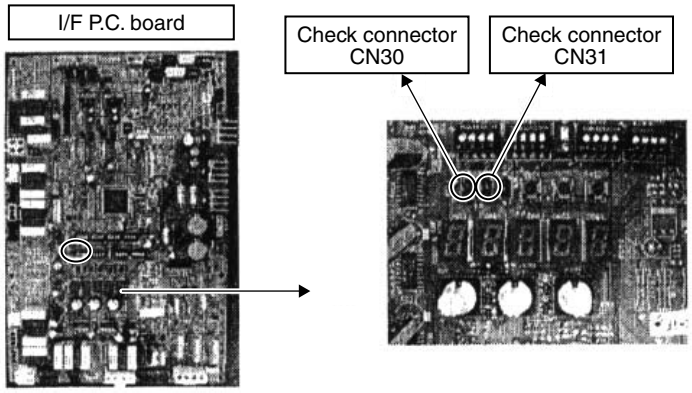
[Close fully]

Short-circuit for CN31 on the outdoor interface P.C. board.

[Clear]

After 2 minutes, the opening returns to the normal opening.

Be sure to remove the short-circuited cord after confirmation.



16-2-5. Solenoid Valve Forced Open/Close Function in Outdoor Unit

This function is provided to forcedly open each solenoid valve mounted in the outdoor unit by the switch operation on the interface P.C. board in the outdoor unit. When checking there is no refrigerant clogging with ON/OFF operation of the solenoid valve, use this function.

[Operation]

1. Set the switch SW01 on the interface P.C. board of the outdoor unit to [2], SW02 to [1], SW03 to [3].
2. When [H. r] is displayed in 7-segment display [A], keep pushing the switch SW04 for 2 seconds or more.
3. From when [2] is displayed in 7-segment display [B], SV2 is turned on.
4. After then, ON and OFF of each solenoid valve are exchanged by changing the setup number of the switch SW02.

   (ON/OFF output pattern of each solenoid valve is as follows.)

   NOTE 1) Display in 7-segment display [B] is exchanged just when the number of SW02 has been changed, on the other hand, the solenoid valve output is exchanged when SW02 has kept with the same number for 5 seconds or more.

   NOTE 2) The mark [○] in the table indicates the corresponding solenoid valve is forcedly turned on.

   NOTE 3) The mark [—] in the table indicates ON/OFF of the solenoid valve is controlled based upon the specifications of the air conditioner.—

   NOTE 4) The mark [×] in the table indicates the corresponding solenoid valve is forcedly turned off with this operation.

   NOTE 5) The case heater outputs for both compressor and accumulator heaters.

SW02	7-segment display [B]	SV2	SV5	SV6	SV11	SV12	SV41	SV42	SV3A	SV3B	SV3C	SV3D	SV3E	Case heater
1	[··· 2 ···]	○	—	—	—	—	—	—	—	—	—	—	○	○
2	[··· 5 ···]	—	○	—	—	—	—	—	—	—	—	—	○	○
3	[··· 6 —]	—	—	○	—	—	—	—	—	—	—	—	○	○
4	[··· 1 1]	—	—	—	○	—	—	—	—	—	—	—	○	○
5	[··· 1 2]	—	—	—	—	○	—	—	—	—	—	—	○	○
6	[··· 4 1]	—	—	—	—	—	○	—	—	—	—	—	○	○
7	[··· 4 2]	—	—	—	—	—	—	○	—	—	—	—	○	○
8	[··· 4 —]	—	—	—	—	—	○	○	—	—	—	—	○	○
9	[··· 3 A]	—	—	—	—	—	—	—	○	—	—	—	○	○
10	[··· 3 b]	—	—	—	—	—	—	—	—	○	—	—	○	○
11	[··· 3 C]	—	—	—	—	—	—	—	—	—	○	—	○	○
12	[··· 3 d]	—	—	—	—	—	—	—	—	—	—	○	○	○
13	[··· 3 E]	—	—	—	—	—	—	—	—	—	—	—	×	○
14	[··· 3 —]	—	—	—	—	—	—	—	○	○	○	—	○	○
15	[··· ··· ···]	—	—	—	—	—	—	—	—	—	—	—	○	○
16	[A L L]	○	○	○	○	○	○	○	○	○	○	○	○	○

[Clear]

Return numbers of SW01, SW02, and SW03 on the interface P.C. board to [1] each.

NOTE) As this control is not based on the specifications of the general air conditioner, be sure to release this mode after confirmation.

16-2-6. Fan forced Operation Function in Outdoor Unit

This function is provided to forcedly operate the fan in the outdoor unit by the switch operation on the interface P.C. board in the outdoor unit. The frequency of the fan can be controlled by setup of the switch. Therefore utilize this function to check the operation or abnormal sound in the fan system. Be sure to use this function during stop of controlling.

NOTE) Do not use this function during operation of the compressor. It may break the compressor.

[Operation]

1. Set the switch SW01 on the interface P.C. board of the outdoor unit to [2], SW02 to [1], SW03 to [4].
2. When [F. d] is displayed in 7-segment display [A], keep pushing the switch SW04 for 2 seconds or more.
3. From when [31] is displayed in 7-segment display [B], the fan starts operation. (Super mode operation)
4. After then, 7-segment display [B] and the fan mode are changed by changing the setup number of the switches SW02 and SW03.

   (Output pattern of the fan is as follows.)

SW02	SW03	7-segment display [B]	Fan mode	SW02	SW03	7-segment display [B]	Fan mode
1	4	[31]	31	1	5	[15]	15
2		[30]	30	2		[14]	14
3		[29]	29	3		[13]	13
4		[28]	28	4		[12]	12
5		[27]	27	5		[11]	11
6		[26]	26	6		[10]	10
7		[25]	25	7		[9]	9
8		[24]	24	8		[8]	8
9		[23]	23	9		[7]	7
10		[22]	22	10		[6]	6
11		[21]	21	11		[5]	5
12		[20]	20	12		[4]	4
13		[19]	19	13		[3]	3
14		[18]	18	14		[2]	2
15		[17]	17	15		[1]	1
16		[16]	16	16		[0]	0

[Clear]

This function is cleared by one of the following operations.

1. SW01 moved to other position.
2. Push-switch SW05 was pushed for 2 seconds or more.

16-2-7. Manual Adjustment Function of Outside Temp (TO) Sensor

This function is provided to fix TO sensor value manually by the switch operation on the interface P.C. board in the outdoor unit. When the unit stops abnormally due to TO sensor failure, etc, an emergent operation is available by set up the value manually to position near the current outside temperature.

[Operation]

1. Set the rotary switches on the interface P.C. board to numbers as follows.
   - SW01 [2] / SW02 [1] / SW03 [15]
   - 7-segment display: [t o]

SW01	SW02	7-segment display [B]	TO sensor value
1	1	[10]	10°C
	2	[15]	15°C
	3	[20]	20°C
	4	[25]	25°C
	5	[30]	30°C
	6	[35]	35°C
	7	[40]	40°C
	8	[43]	43°C

SW01	SW02	7-segment display [B]	TO sensor value
1	9	[45]	45°C
	10	[–15]	–15°C
	11	[–10]	–10°C
	12	[– 5]	–5°C
	13	[0]	0°C
	14	[2]	2°C
	15	[5]	5°C
	16	[7]	7°C

NOTE) Emergent operation should be restricted to one day or so on. If operating TO sensor fixed with this function, the system control operation of the air conditioner may not become one based upon the specification of the product. Therefore an emergent operation should be restricted to a day or so on.

2. Keep pushing the push-switch SW04 on the interface P.C. board for 1 second or more.
   The mode changes to the TO sensor value fix manual mode.
3. As shown in the following table, TO sensor value can be fixed by setting the rotary switch SW02 on the interface P.C. board.

[Clear]

Return numbers of SW01, SW02, and SW03 on the interface P.C. board in the outdoor unit to [1/1/1] each.

16-2-8. Indoor Fan Operation Check Function

This function is provided to check operation of single indoor unit without using communication with the remote controller or outdoor unit. This function can be used regardless operating or stopping of the system.

However, if this function is used for a long time, a trouble of the air conditioner may be caused. Therefore using of this function should be restricted to several minutes.

[Operation]

1. Short-circuit CHK pin (CN71 on the indoor P.C. board).

   If short-circuiting DISP pin (CN72 on the indoor P.C. board) while short-circuiting CHK pin (CN71 on the indoor P.C. board), the indoor PMV only becomes the minimum opening (30 pulse). When opening DISP pin, it becomes the maximum opening again.

[Clear]

Open CHK pin. If the system is operating, it stops once but automatically restart after several minutes.

* For the details of CHK pin (CN71 on indoor P.C. board) and DISP pin (CN72 on indoor P.C. board), refer to **11. Control circuit configuration, Indoor unit 2, Indoor P.C. board MCC-1402 and MCC-1403**.

16-2-9. Indoor Fan Only Operating Mode

When operating an air conditioner with indoor units and remote controller only in fan operation etc., this function can be used. A group operation is also available.

[Operation]

1) Short circuit DISP pin (CN72 on the indoor P.C. board). However, if CHK pin (CN71 on the indoor P.C. board) has been previously short circuited, this function is unavailable.
2) In a group operation, set up a group as usual.
3) While DISP pin is short circuited, all the sensor error judgment operation and communication with the outdoor unit are not performed. PMV is fixed to the Max. opening.

[Clear]

Open DISP pin.

16-2-10. Remote Controller Switch Monitor Function

When using a remote controller with the model name RBC-AMT21E, the following monitor functions can be used.

<Calling of display screen>

[Contents]

The temperature or the operation status of the remote controller, indoor unit, or each sensor of the outdoor unit can be known by calling up the service monitor mode from the remote controller.

[Procedure]

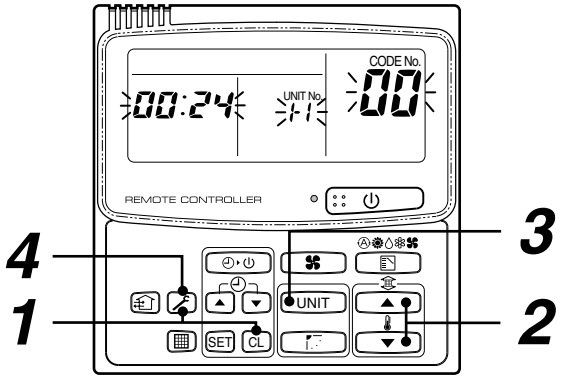
1 **Push [CL] + [🔧] buttons simultaneously for 4 seconds or more to call up the service monitor mode. The service monitor goes on, and temperature of the item code *00* is firstly displayed.**

2 **Push the temperature setup [▲] / [▼] buttons to select the item number (Item code) to be monitored.**

For displayed codes, refer to the following table.

3 **Push [UNIT] button to change the item to one to be monitored. Then monitor the indoor unit and sensor temperature or operation status in the corresponding refrigerant system.**

4 **Pushing [🔧] button returns the display to the normal display.**



Operation procedure

1 → ***2*** → ***3*** → ***4***

Returns to the normal display

	Item code	Data name	Unit	Display format		Item code	Data name	Unit	Display format
Indoor unit data (NOTE 2)	00	Room temp (During control)	°C		Outdoor unit individual data	10	Compressor 1 discharge temp (Td1)	°C	× 1
	01	Room temp (Remote controller)	°C			11	Compressor 2 discharge temp (Td2)	°C	× 1
	02	Indoor suction temp (TA)	°C	× 1		12	High-pressure sensor detention pressure (Pd)	MPa	× 100
	03	Indoor coil temp (TCJ)	°C	× 1		13	Low-pressure sensor detention pressure (Ps)	MPa	× 100
	04	Indoor coil temp (TC2)	°C	× 1		14	Suction temp (TS)	°C	× 1
	05	Indoor coil temp (TC1)	°C	× 1		15	Outdoor coil temp (TE)	°C	× 1
	06	Indoor discharge temp (Tf) (NOTE 1)	°C	× 1		16	Temp at liquid side (TL)	°C	× 1
	08	Indoor PMV opening	pls	× 1/10		17	Outside temp (TO)	°C	× 1
System data	0A	No. of connected indoor units	unit			18	Low-pressure saturation temp (TU)	°C	× 1
	0b	Total HP of connected indoor units	HP	× 10		19	Compressor 1 current (I1)	A	× 10
	0C	No. of connected outdoor units	unit			1A	Compressor 2 current (I2)	A	× 10
	0d	Total HP of outdoor units	HP	× 10		1b	PMV1 + 2 opening	pls	× 1/10
						1d	Compressor 1, 2 ON/OFF	—	(NOTE 3)
						1E	Outdoor fan mode	—	0 to 31
						1F	Outdoor unit HP	HP	× 1

(NOTE 1) Only a part of indoor unit types is installed with the discharge temperature sensor. This temperature is not displayed for other types.

(NOTE 2) When the units are connected to a group, data of the header indoor unit only can be displayed.

(NOTE 3) 01 : Compressor 1 only is ON.
10 : Compressor 2 only is ON.
11 : Both compressor 1 and 2 are ON.

16-2-11. Abnormal Outdoor Unit Discrimination Method <By Fan Operating Function>

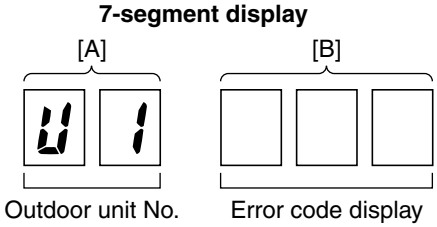
This function is provided to forcedly operate the fan of the outdoor unit in which an error occurred or the fan of the normal outdoor unit by the switch operation on the interface P.C. board in the header unit.

To specify which one of the follower units connected to the system was faulty, use this function for the system stop due to a follower unit fault (Check code [E28]).

[Operation]

<In case to operate the fan in the erroneous outdoor unit only>

1. Check all the switches, SW01, SW02, and SW03 on the interface P.C. board in the header unit are set to [1].



2. Push the push-switch SW04 for 2 seconds or more.
3. “E1” is displayed on 7-segment display [A].
4. The fan of the outdoor unit in which error occurred starts operation within approx. 10 seconds when “E1” was displayed.

<In case to operate the fans in all the normal outdoor units>

1. Check all the switches, SW01, SW02, and SW03 on the interface P.C. board are set to [1/1/1].
2. Push the push-switches SW04 and SW05 at the same time for 2 seconds or more.
3. “E0” is displayed on 7-segment display [A].
4. The fans of all the normal outdoor units start operation with the Max. fan speed within approx. 10 seconds when “E0” was displayed.

[Clear]

Push the push-switch SW05 on the interface P.C. board in the header unit for 2 seconds or more.

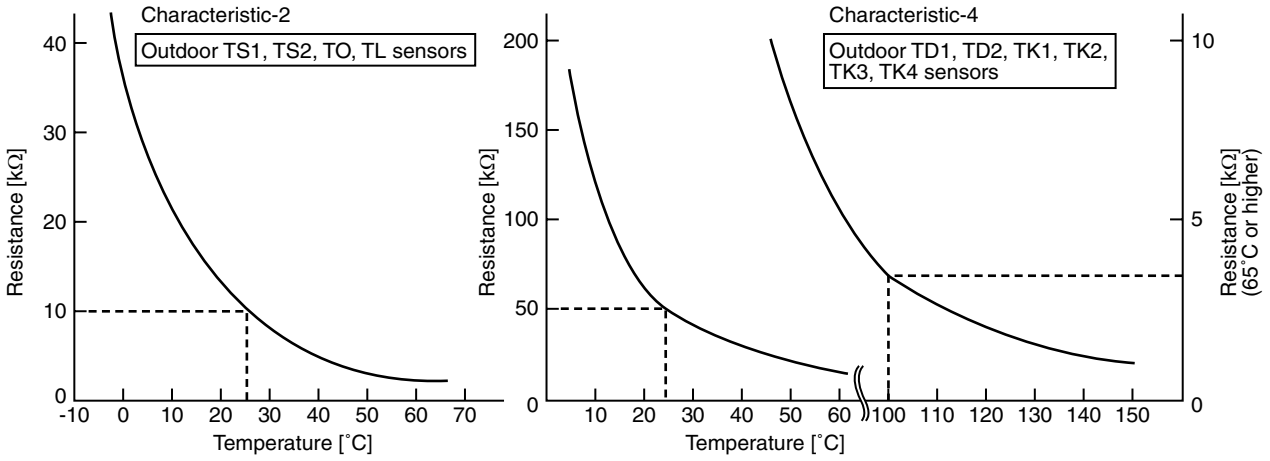
The outdoor fan which was operated stops.

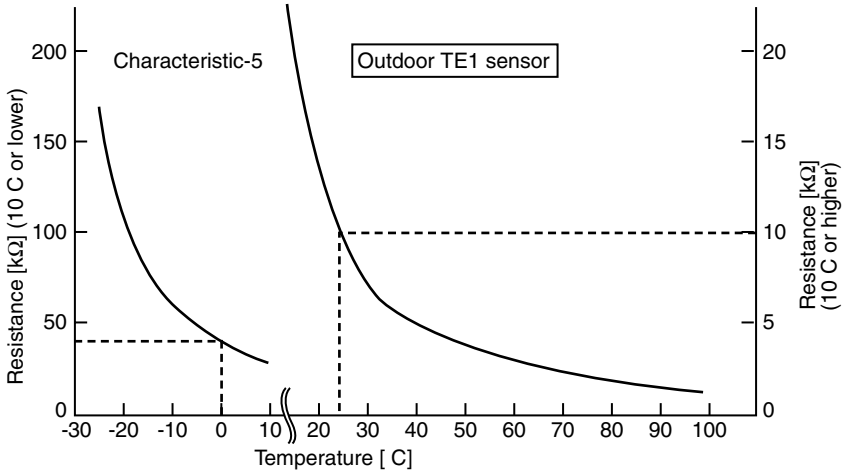
* Check [U. 1] is displayed on 7-segment display [A], and then finish the work.

16-3. Sensor Characteristics

16-3-1. Outdoor Unit

■ Temperature sensor characteristics





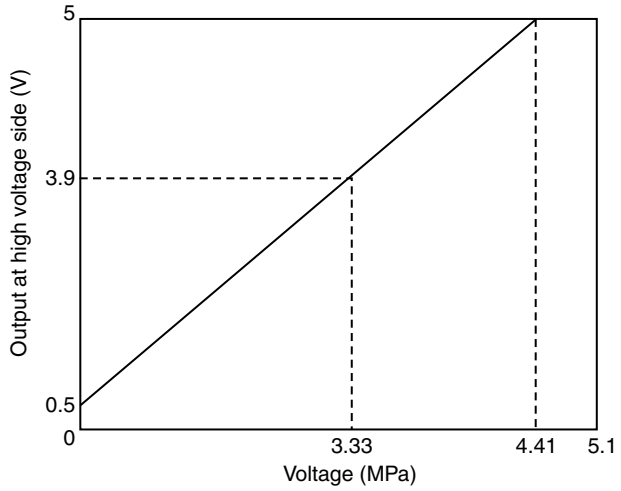
■ Pressure sensor characteristics

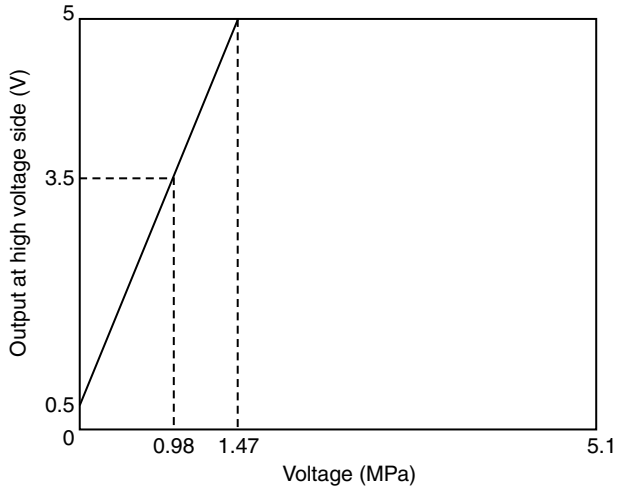
• I/O cable connection table

Pin No.	High pressure side (Pd)		Low pressure side (Ps)	
	I/O name	Lead cable color	I/O name	Lead cable color
1	OUTPUT	White	—	—
2	—	—	OUTPUT	White
3	GND	Black	GND	Black
4	+5V	Red	+5V	Red

• Output voltage — Pressure

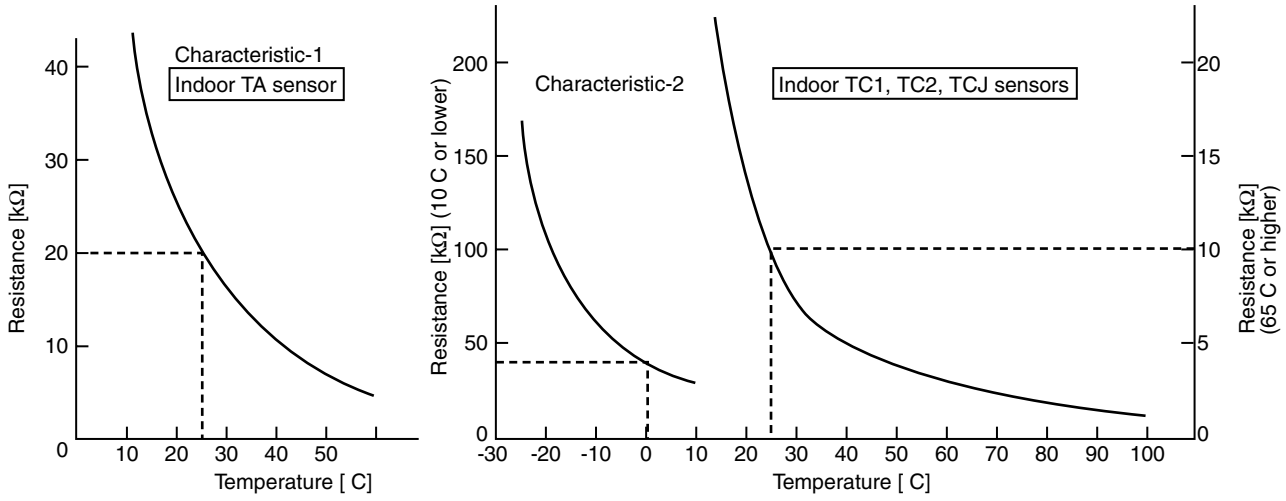
High pressure side (Pd)	Low pressure side (Ps)
0.5 to 3.9 V	0.5 to 3.5 V
0 to 3.33 MPa	0 to 0.98 MPa





16-3-2. Indoor Unit

■ Temperature sensor characteristics



16-4. Pressure Sensor Output Check

16-4-1. Outdoor Unit

■ Pd sensor characteristics

0 to 4.41MPa (0.5 to 5V output with 0 to 4.41MPa)
Voltage check between CN501 ② and ③ pins on the outdoor unit interface P.C. board (Tester ⊖ rod at ③ pin side)

VOLT	Pd (MPa)	Pd (kg/cm²)	VOLT	Pd (MPa)	Pd (kg/cm²)	VOLT	Pd (MPa)	Pd (kg/cm²)	VOLT	Pd (MPa)	Pd (kg/cm²)	VOLT	Pd (MPa)	Pd (kg/cm²)
0.00	0.00	0.0	1.00	0.49	5.0	1.99	1.46	14.9	2.99	2.44	24.9	3.98	3.42	34.8
0.02	0.00	0.0	1.02	0.51	5.2	2.01	1.48	15.1	3.01	2.46	25.1	4.00	3.44	35.0
0.04	0.00	0.0	1.04	0.53	5.4	2.03	1.50	15.3	3.03	2.48	25.3	4.02	3.45	35.2
0.06	0.00	0.0	1.06	0.54	5.5	2.05	1.52	15.5	3.05	2.50	25.5	4.04	5.48	35.4
0.08	0.00	0.0	1.07	0.56	5.7	2.07	1.54	15.7	3.07	2.52	25.7	4.06	3.49	35.6
0.10	0.00	0.0	1.09	0.58	5.9	2.09	1.56	15.9	3.09	2.54	25.9	4.08	3.51	35.8
0.12	0.00	0.0	1.11	0.60	6.1	2.11	1.58	16.1	3.11	2.56	26.1	4.10	3.53	36.0
0.14	0.00	0.0	1.13	0.62	6.3	2.13	1.60	16.3	3.13	2.57	26.3	4.12	3.55	36.2
0.16	0.00	0.0	1.15	0.64	6.5	2.15	1.62	16.5	3.15	2.59	26.4	4.14	3.57	36.4
0.18	0.00	0.0	1.17	0.66	6.7	2.17	1.64	16.7	3.16	2.61	26.6	4.16	3.59	36.6
0.20	0.00	0.0	1.19	0.68	6.9	2.19	1.66	16.9	3.18	2.63	26.8	4.18	3.61	36.8
0.22	0.00	0.0	1.21	0.70	7.1	2.21	1.67	17.1	3.20	2.65	27.0	4.20	3.63	37.0
0.23	0.00	0.0	1.23	0.72	7.3	2.23	1.69	17.3	3.22	2.67	27.2	4.22	3.65	37.2
0.25	0.00	0.0	1.25	0.74	7.5	2.25	1.71	17.5	3.24	2.69	27.4	4.24	3.67	37.4
0.27	0.00	0.0	1.27	0.76	7.7	2.27	1.73	17.7	3.26	2.71	27.6	4.26	3.69	37.6
0.29	0.00	0.0	1.29	0.77	7.9	2.29	1.75	17.9	3.28	2.73	27.8	4.28	3.70	37.8
0.31	0.00	0.0	1.31	0.79	8.1	2.31	1.77	18.0	3.30	2.75	28.0	4.30	3.72	38.0
0.33	0.00	0.0	1.33	0.81	8.3	2.32	1.79	18.2	3.32	2.77	28.2	4.32	3.74	38.2
0.35	0.00	0.0	1.35	0.83	8.5	2.34	1.81	18.4	3.34	2.79	28.4	4.24	3.76	38.4
0.37	0.00	0.0	1.37	0.85	8.7	2.36	1.83	18.6	3.36	2.80	28.6	4.36	3.78	38.6
0.39	0.00	0.0	1.39	0.87	8.9	2.38	1.85	18.8	3.38	2.82	28.8	4.38	3.80	38.8
0.41	0.00	0.0	1.41	0.89	9.1	2.40	1.87	19.0	3.40	2.84	29.0	4.40	3.82	38.9
0.43	0.00	0.0	1.43	0.91	9.3	2.42	1.89	19.2	3.42	2.86	29.2	4.41	3.84	39.1
0.45	0.00	0.0	1.45	0.93	9.5	2.44	1.90	19.4	3.44	2.88	29.4	4.43	3.86	39.3
0.47	0.00	0.0	1.47	0.95	9.6	2.46	1.92	19.6	3.46	2.90	29.6	4.45	3.88	39.5
0.49	0.00	0.0	1.48	0.97	9.8	2.48	1.94	19.8	3.48	2.92	29.8	4.47	3.90	39.7
0.51	0.01	0.1	1.50	0.99	10.0	2.50	1.96	20.0	3.50	2.94	30.0	4.49	3.92	39.9
0.53	0.03	0.3	1.52	1.00	10.2	2.52	1.98	20.2	3.52	2.96	30.2	4.51	3.93	40.1
0.55	0.05	0.5	1.54	1.02	10.4	2.54	2.00	20.4	3.54	2.98	3.04	4.53	3.95	40.3
0.57	0.07	0.7	1.56	1.04	10.6	2.56	2.02	20.6	3.56	3.00	30.5	4.55	3.97	40.5
0.59	0.08	0.9	1.58	1.06	10.8	2.58	2.04	20.8	3.57	3.02	30.7	4.57	3.99	40.7
0.61	0.10	1.1	1.60	1.08	11.0	2.60	2.06	21.0	3.59	3.03	30.9	4.59	4.01	40.9
0.63	0.12	1.3	1.62	1.10	11.2	2.62	2.08	21.2	3.61	3.05	31.1	4.61	4.03	41.1
0.65	0.14	1.4	1.64	1.12	11.4	2.64	1.10	21.4	3.63	3.07	31.3	4.63	4.05	41.3
0.66	0.16	1.6	1.66	1.14	11.6	2.66	2.12	21.6	3.65	3.09	31.5	4.65	4.07	41.5
0.68	0.18	1.8	1.68	1.16	11.8	2.68	2.13	21.8	3.67	3.11	31.7	4.67	4.09	41.7
0.70	0.20	2.0	1.70	1.18	12.0	2.70	2.15	22.0	3.69	3.13	31.9	4.69	4.11	41.9
0.72	0.22	2.2	1.72	1.20	12.2	2.72	2.17	22.2	3.71	3.15	32.1	4.71	4.13	42.1
0.74	0.24	2.4	1.74	1.21	12.4	2.73	2.19	22.3	3.73	3.17	32.3	4.73	4.15	42.3
0.76	0.26	2.6	1.76	1.23	12.6	2.75	2.21	22.5	3.75	3.19	32.5	4.75	4.16	42.5
0.78	0.28	2.8	1.78	1.25	12.8	2.77	2.23	22.7	3.77	3.21	32.7	4.77	4.18	42.7
0.80	0.30	3.0	1.80	1.27	13.0	2.79	2.25	22.9	3.79	3.23	32.9	4.79	4.20	42.9
0.82	0.31	3.2	1.82	1.29	13.2	2.81	2.27	23.1	3.81	3.25	33.1	4.81	4.22	43.0
0.84	0.33	3.4	1.84	1.31	13.4	2.83	2.29	23.3	3.83	3.26	33.3	4.82	4.24	43.2
0.86	0.35	3.6	1.86	1.33	13.6	2.85	2.31	23.5	3.85	3.28	33.5	4.84	4.26	43.4
0.88	0.37	3.8	1.88	1.35	13.8	2.87	2.33	23.7	3.87	3.30	33.7	4.86	4.28	43.6
0.90	0.39	4.0	1.90	1.37	13.9	2.89	2.35	23.9	3.89	3.32	33.9	4.88	4.30	43.8
0.92	0.41	4.2	1.91	1.39	14.1	2.91	2.36	24.1	3.91	3.34	34.1	4.90	4.32	44.0
0.94	0.43	4.4	1.93	1.41	14.3	2.93	2.38	24.3	3.93	3.36	34.3	4.92	4.34	44.2
0.96	0.45	4.6	1.95	1.43	14.5	2.95	2.40	24.5	3.95	3.38	34.5	4.94	4.36	44.4
0.98	0.47	4.8	1.97	1.44	14.7	2.97	2.42	24.7	3.97	3.40	34.7	4.96	4.38	44.6
												4.98	4.39	44.8

16-4-2. Outdoor Unit

■ Ps sensor characteristics

0 to 1.47MPa (0.5 to 5V output with 0 to 1.47MPa)
Voltage check between CN500 ② and ③ pins on the outdoor unit interface P.C. board (Tester ⊖ rod at ③ pin side)

VOLT	Ps (MPa)	Ps (kg/cm²)	VOLT	Ps (MPa)	Ps (kg/cm²)	VOLT	Ps (MPa)	Ps (kg/cm²)	VOLT	Ps (MPa)	Ps (kg/cm²)	VOLT	Ps (MPa)	Ps (kg/cm²)
0.00	0.00	0.0	1.00	0.16	1.7	1.99	0.49	5.0	2.99	0.81	8.3	3.98	1.14	11.6
0.02	0.00	0.0	1.02	0.17	1.7	2.01	0.49	5.0	3.01	0.82	8.4	4.00	1.15	11.7
0.04	0.00	0.0	1.04	0.18	1.8	2.03	0.50	5.1	3.03	0.83	8.4	4.02	1.15	11.7
0.06	0.00	0.0	1.06	0.18	1.8	2.05	0.51	5.2	3.05	0.83	8.5	4.04	1.16	11.8
0.08	0.00	0.0	1.07	0.19	1.9	2.07	0.51	5.2	3.07	0.84	8.6	4.06	1.17	11.9
0.10	0.00	0.0	1.09	0.19	2.0	2.09	0.52	5.3	3.09	0.85	8.6	4.08	1.17	11.9
0.12	0.00	0.0	1.11	0.20	2.0	2.11	0.53	5.4	3.11	0.85	8.7	4.10	1.18	12.0
0.14	0.00	0.0	1.13	0.21	2.1	2.13	0.53	5.4	3.13	0.86	8.8	4.12	1.18	12.1
0.16	0.00	0.0	1.15	0.21	2.2	2.15	0.54	5.5	3.15	0.86	8.8	4.14	1.19	12.1
0.18	0.00	0.0	1.17	0.22	2.2	2.17	0.55	5.6	3.16	0.87	8.9	4.16	1.20	12.2
0.20	0.00	0.0	1.19	0.23	2.3	2.19	0.55	5.6	3.18	0.88	8.9	4.18	1.20	12.3
0.22	0.00	0.0	1.21	0.23	2.4	2.21	0.56	5.7	3.20	0.88	9.0	4.20	1.21	12.3
0.23	0.00	0.0	1.23	0.24	2.4	2.23	0.56	5.8	3.22	0.89	9.1	4.22	1.22	12.4
0.25	0.00	0.0	1.25	0.25	2.5	2.25	0.57	5.8	3.24	0.90	9.1	4.24	1.22	12.5
0.27	0.00	0.0	1.27	0.25	2.6	2.27	0.58	5.9	3.26	0.90	9.2	4.26	1.23	12.5
0.29	0.00	0.0	1.29	0.26	2.6	2.29	0.58	6.0	3.28	0.91	9.3	4.28	1.24	12.6
0.31	0.00	0.0	1.31	0.26	2.7	2.31	0.59	6.0	3.30	0.92	9.3	4.30	1.24	12.7
0.33	0.00	0.0	1.33	0.27	2.8	2.32	0.60	6.1	3.32	0.92	9.4	4.32	1.25	12.7
0.35	0.00	0.0	1.35	0.28	2.8	2.34	0.60	6.1	3.34	0.93	9.5	4.34	1.25	12.8
0.37	0.00	0.0	1.37	0.28	2.9	2.36	0.61	6.2	3.36	0.94	9.5	4.36	1.26	12.9
0.39	0.00	0.0	1.39	0.29	3.0	2.38	0.62	6.3	3.38	0.94	9.6	4.38	1.27	12.9
0.41	0.00	0.0	1.41	0.30	3.0	2.40	0.62	6.3	3.40	0.95	9.7	4.40	1.27	13.0
0.43	0.00	0.0	1.43	0.30	3.1	2.42	0.63	6.4	3.42	0.95	9.7	4.41	1.28	13.0
0.45	0.00	0.0	1.45	0.31	3.2	2.44	0.64	6.5	3.44	0.96	9.8	4.43	1.29	13.1
0.47	0.00	0.0	1.47	0.32	3.2	2.46	0.64	6.5	3.46	0.97	9.9	4.45	1.29	13.2
0.49	0.00	0.0	1.48	0.32	3.3	2.48	0.65	6.6	3.48	0.97	9.9	4.47	1.30	13.2
0.51	0.00	0.0	1.50	0.33	3.3	2.50	0.65	6.7	3.50	0.98	10.0	4.49	1.31	13.3
0.53	0.01	0.1	1.52	0.34	3.4	2.52	0.66	6.7	3.52	0.99	10.1	4.51	1.31	13.4
0.55	0.02	0.3	1.54	0.34	3.5	2.54	0.67	6.8	3.54	0.99	10.1	4.53	1.32	13.4
0.57	0.02	0.2	1.56	0.35	3.5	2.56	0.67	6.9	3.56	1.00	10.2	4.55	1.32	13.5
0.59	0.03	0.3	1.58	0.35	3.6	2.58	0.68	6.9	3.57	1.01	10.2	4.57	1.33	13.6
0.61	0.03	0.4	1.60	0.36	3.7	2.60	0.69	7.0	3.59	1.01	10.3	4.59	1.34	13.6
0.63	0.04	0.4	1.62	0.37	3.7	2.62	0.69	7.1	3.61	1.02	10.4	4.61	1.34	13.7
0.65	0.05	0.5	1.64	0.37	3.8	2.64	0.70	7.1	3.63	1.02	10.4	4.63	1.35	13.8
0.66	0.05	0.5	1.66	0.38	3.9	2.66	0.71	7.2	3.65	1.03	10.5	4.65	1.36	13.8
0.68	0.06	0.6	1.68	0.39	3.9	2.68	0.71	7.3	3.67	1.04	10.6	4.67	1.36	13.9
0.70	0.07	0.7	1.70	0.39	4.0	2.70	0.72	7.3	3.69	1.04	10.6	4.69	1.37	14.0
0.72	0.07	0.7	1.72	0.40	4.1	2.72	0.72	7.4	3.71	1.05	10.7	4.71	1.38	14.0
0.74	0.08	0.8	1.74	0.41	4.1	2.73	0.73	7.4	3.73	1.06	10.8	4.73	1.38	14.1
0.76	0.09	0.9	1.76	0.41	4.2	2.75	0.74	7.5	3.75	1.06	10.8	4.75	1.39	14.2
0.78	0.09	0.9	1.78	0.42	4.3	2.77	0.74	7.6	3.77	1.07	10.9	4.77	1.39	14.2
0.80	0.10	1.0	1.80	0.42	4.3	2.79	0.75	7.6	3.79	1.08	11.0	4.79	1.40	14.3
0.82	0.11	1.1	1.82	0.43	4.4	2.81	0.76	7.7	3.81	1.08	11.0	4.81	1.41	14.3
0.84	0.11	1.1	1.84	0.44	4.5	2.83	0.76	7.8	3.83	1.09	11.1	4.82	1.41	14.4
0.86	0.12	1.2	1.86	0.44	4.5	2.85	0.77	7.8	3.85	1.09	11.2	4.84	1.42	14.5
0.88	0.12	1.3	1.88	0.45	4.6	2.87	0.78	7.9	3.89	1.10	11.2	4.86	1.43	14.5
0.90	0.13	1.3	1.90	0.46	4.6	2.89	0.78	8.0	3.89	1.11	11.3	4.88	1.43	14.6
0.92	0.14	1.4	1.91	0.46	4.7	2.91	0.79	8.0	3.91	1.11	11.4	4.90	1.44	14.7
0.94	0.14	1.5	1.93	0.47	4.8	2.93	0.79	8.1	3.93	1.12	11.4	4.92	1.45	14.7
0.96	0.15	1.5	1.95	0.48	4.8	2.95	0.80	8.2	3.95	1.13	11.5	4.94	1.45	14.8
0.98	0.16	1.6	1.97	0.48	4.9	2.97	0.81	8.2	3.97	1.13	11.5	4.96	1.46	14.9
												4.98	1.47	14.9

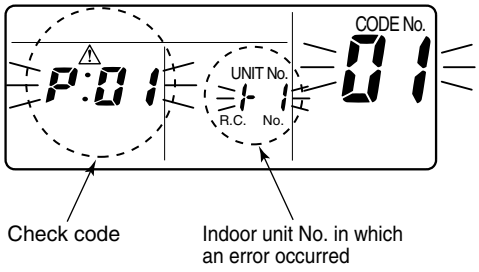
17. TROUBLESHOOTING

Confirmation and check

When a trouble occurred in the air conditioner, the check code and the indoor unit No. appear on the display part of the remote controller.

The check code is only displayed during the operation.

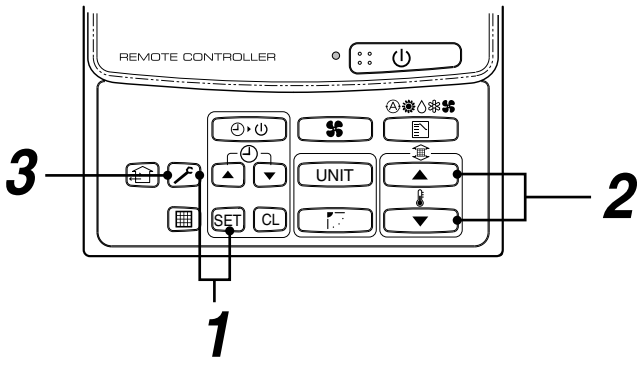
If the display disappears, operate the air conditioner according to the following “Confirmation of error history” for confirmation.

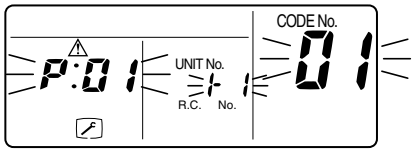


Confirmation of error history

When a trouble occurred on the air conditioner, the error history can be confirmed with the following procedure.
(The error history is stored in memory up to 4 errors.)

This history can be confirmed from either operating status or stop status.



Procedure	Description	
1	When pushing [SET] and [🔧] buttons simultaneously for 4 seconds or more, the right display appears. If [Service Check] is displayed, the mode enters in the error history mode. • [01: Order of error history] is displayed in CODE No. window. • [Check Code] is displayed in CHECK window. • [Indoor unit address in which an error occurred] is displayed in UNIT No.	
2	Every pushing [▲], [▼] buttons, the error history stored in the memory is displayed in order. The numbers in CODE No. indicates CODE No. [01] (Latest) → [04] (Oldest). **CAUTION** Do not push [CL] button because all the error history of the indoor unit will be deleted.	
3	After confirmation, push [🔧] button to return to the usual display.	

Check method

On the remote controller (Main remote controller, Central control remote controller) and the interface P.C. board of the outdoor unit, a check display LCD (Remote controller) or 7-segment display (on the outdoor interface P.C. board) to display the operation is provided. Therefore the operation status can be known. Using this self-diagnosis function, a trouble or position with error of the air conditioner can be found as shown in the table below.

Check code list

The following list shows each check code. Find the check contents from the list according to part to be checked.

- In case of check from indoor remote controller: See “Main remote controller display” in the list.
- In case of check from outdoor unit: See “Outdoor 7-segment display” in the list.
- In case of check from AI-NET central control remote controller: See “AI-NET central control display” in the list.
- In case of check from indoor unit with wireless remote controller: See “Sensor block display of receiving unit” in the list.

Terminology

AI-NET : Artificial Intelligence.
IPDU : Intelligent Power Drive Unit
○ : Lighting, ¤ : Flashing, ● : Goes off
ALT. : Flashing is alternately when there are two flashing LED.
SIM : Simultaneous flashing when there are two flashing LED.

Check code				Wireless remote controller				Check code name	Judging device
Main remote controller display	Outdoor 7-segment display		AI-NET central control display	Sensor block display of receiving unit					
		Auxiliary code		Operation	Timer	Ready	Flash		
E01	—	—	—	¤	●	●		Communication error between indoor and remote controller (Detected at remote controller side)	Remote controller
E02	—	—	—	¤	●	●		Remote controller transmission error	Remote controller
E03	—	—	97	¤	●	●		Communication error between indoor and remote controller (Detected at indoor side)	Indoor
E04	—	—	04	●	●	¤		Communication circuit error between indoor/ outdoor (Detected at indoor side)	Indoor
E06	E06	No. of indoor units in which sensor has been normally received	04	●	●	¤		Decrease of No. of indoor units	I/F
—	E07	—	—	●	●	¤		Communication circuit error between indoor/ outdoor (Detected at outdoor side)	I/F
E08	E08	Duplicated indoor addresses	96	¤	●	●		Duplicated indoor addresses	Indoor / I/F
E09	—	—	99	¤	●	●		Duplicated main remote controllers	Remote controller
E10	—	—	CF	¤	●	●		Communication error between indoor MCU	Indoor
E12	E12	01: Indoor/Outdoor communication 02: Communication between outdoor units	42	¤	●	●		Automatic address start error	I/F
E15	E15	—	42	●	●	¤		Indoor is nothing during automatic addressing	I/F
E16	E16	00: Capacity over 01 ~:No. of connected units	89	●	●	¤		Capacity over / No. of connected indoor units	I/F
E18	—	—	97, 99	¤	●	●		Communication error between indoor units	Indoor
E19	E19	00: Header is nothing 02: Two or more header units	96	●	●	¤		Outdoor header units quantity error	I/F
E20	E20	01: Outdoor of other line connected 02: Indoor of other line connected	42	●	●	¤		Other line connected during automatic address	I/F
E23	E23	—	15	●	●	¤		Sending error in communication between outdoor units	I/F
E25	E25	—	15	●	●	¤		Duplicated follower outdoor units	I/F
E26	E26	No. of outdoor units which received signal normally	15	●	●	¤		Decrease of No. connected outdoor units	I/F
E28	E28	Detected outdoor unit number	d2	●	●	¤		Follower outdoor error	I/F
E31	E31	01: IPDU1 error 02: IPDU2 error 03: IPDU1, 2 error 04: Fan IPDU error 05: IPDU + Fan IPDU error 06: IPDU2 + Fan IPDU error 07: All IPDU error	CF	●	●	¤		IPDU communication error	I/F

Check code				Wireless remote controller				Check code name	Judging device
Main remote controller display	Outdoor 7-segment display		AI-NET central control display	Sensor block display of receiving unit					
		Auxiliary code		Operation	Timer	Ready	Flash		
F01	—	—	0F	¤	¤	●	ALT	Indoor TCJ sensor error	Indoor
F02	—	—	0d	¤	¤	●	ALT	Indoor TC2 sensor error	Indoor
F03	—	—	93	¤	¤	●	ALT	Indoor TC1 sensor error	Indoor
F04	F04	—	19	¤	¤	○	ALT	TD1 sensor error	I/F
F05	F05	—	A1	¤	¤	○	ALT	TD2 sensor error	I/F
F06	F06	—	18	¤	¤	○	ALT	TE1 sensor error	I/F
F07	F07	—	18	¤	¤	○	ALT	TL sensor error	I/F
F08	F08	—	1b	¤	¤	○	ALT	TO sensor error	I/F
F10	—	—	OC	¤	¤	●	ALT	Indoor TA sensor error	Indoor
F12	F12	01: TS1 sensor error 02: TS2 sensor error	A2	¤	¤	○	ALT	TS1, TS2 sensor error	I/F
F13	F13	01: Comp. 1 side 02: Comp. 2 side	43	¤	¤	○	ALT	TH sensor error	IPDU
F15	F15	—	18	¤	¤	○	ALT	Outdoor temp. sensor miscabling (TE, TL)	I/F
F16	F16	—	43	¤	¤	○	ALT	Outdoor pressure sensor miscabling (Pd, Ps)	I/F
F23	F23	—	43	¤	¤	○	ALT	Ps sensor error	I/F
F24	F24	—	43	¤	¤	○	ALT	Pd sensor error	I/F
F29	—	—	12	¤	¤	●	SIM	Indoor other error	Indoor
F31	F31	—	1C	¤	¤	○	SIM	Indoor EEPROM error	I/F
H01	H01	01: Comp. 1 side 02: Comp. 2 side	IF	●	¤	●		Compressor break down	IPDU
H02	H02	01: Comp. 1 side 02: Comp. 2 side	1d	●	¤	●		Compressor trouble (lock) Magnet switch error Overcurrent relay operation	IPDU MG-SW Overcurrent relay
H03	H03	01: Comp. 1 side 02: Comp. 2 side	17	●	¤	●		Current detect circuit system error	IPDU
H04	H04	—	44	●	¤	●		Comp 1 case thermo operation	I/F
H06	H06	—	20	●	¤	●		Low pressure protective operation	I/F
H07	H07	—	d7	●	¤	●		Oil level down detective protection	I/F
H08	H08	01: TK1 sensor error 02: TK2 sensor error 03: TK3 sensor error 04: TK4 sensor error	d4	●	¤	●		Oil level detective temp sensor error	I/F
H14	H14	—	44	●	¤	●		Comp 2 case thermo operation	I/F
H16	H16	01: TK1 oil circuit system error 02: TK2 oil circuit system error 03: TK3 oil circuit system error 04: TK4 oil circuit system error	d7	●	¤	●		Oil level detective circuit error Magnet switch error Overcurrent relay operation	I/F MG-SW Overcurrent relay
L03	—	—	96	¤	●	¤	SIM	Indoor center unit duplicated	Indoor
L04	L04	—	96	¤	○	¤	SIM	Outdoor line address duplicated	I/F
L05	—	—	96	¤	●	¤	SIM	Duplicated indoor units with priority (Displayed in indoor unit with priority)	I/F
L06	L06	No. of indoor units with priority	96	¤	●	¤	SIM	Duplicated indoor units with priority (Displayed in unit other than indoor unit with priority)	I/F
L07	—	—	99	¤	●	¤	SIM	Group line in individual indoor unit	Indoor
L08	L08	—	99	¤	●	¤	SIM	Indoor group/Address unset	Indoor, I/F
L09	—	—	46	¤	●	¤	SIM	Indoor capacity unset	Indoor
L10	L10	—	88	¤	○	¤	SIM	Outdoor capacity unset	I/F
L18	L18	—	8A	¤	○	¤	SIM	Flow selector unit error	I/F
L20	L20	—	98	¤	○	¤	SIM	Duplicated central control addresses	AI-NET, Indoor
L29	L29	01: IPDU1 error 02: IPDU2 error 03: IPDU3 error 04: Fan IPDU error 05: IPDU1 + Fan IPDU error 06: IPDU2 + Fan IPDU error 07: All IPDU error	CF	¤	○	¤	SIM	No. of IPDU error	I/F
L30	L30	Detected indoor address	b6	¤	○	¤	SIM	Indoor outside interlock	Indoor
—	L31	—	—		—			Extended I/C error	I/F

Check code				Wireless remote controller				Check code name	Judging device
Main remote controller display	Outdoor 7-segment display		AI-NET central control display	Sensor block display of receiving unit					
		Auxiliary code		Operation	Timer	Ready	Flash		
P01	—	—	11	●	☼	☼	ALT	Indoor fan motor error	Indoor
P03	P03	—	1E	☼	●	☼	ALT	Discharge temp. TD1 error	I/F
P04	P04	01: Comp. 1 side 02: Comp. 2 side	21	☼	●	☼	ALT	High-pressure SW system operation	IPDU
P05	P05	01: Phase-missing detection 02: Phase error	AF	☼	●	☼	ALT	Phase-missing detection /Phase error	I/F
P07	P07	01: Comp. 1 side 02: Comp. 2 side	IC	☼	●	☼	ALT	Heat sink overheat error	IPDU, I/F
P10	P10	Detected indoor address	Ob	●	☼	☼	ALT	Indoor overflow error	Indoor
P12	—	—	11	●	☼	☼	ALT	Indoor fan motor error	Indoor
P13	P13	—	47	●	☼	☼	ALT	Outdoor liquid back detection error	I/F
P15	P15	01: TS condition 02: TD condition	AE	☼	●	☼	ALT	Gas leak detection	I/F
P17	P17	—	bb	☼	●	☼	ALT	Discharge temp. TD2 error	I/F
P19	P19	Detected outdoor unit number	O8	☼	●	☼	ALT	4-way valve inverse error	I/F
P20	P20	—	22	☼	●	☼	ALT	High-pressure protective operation	I/F
P22	P22	0 ⎵ : IGBT short 1 ⎵ : Fan motor position detective circuit error 3 ⎵ : Fan motor trouble C ⎵ : TH sensor temp. error (Heat sink overheat) D ⎵ : TH sensor error	1A	☼	●	☼	ALT	Outdoor fan IPDU error	IPDU
P26	P26	01: Comp. 1 side 02: Comp. 2 side	14	☼	●	☼	ALT	G-TR short protection error	IPDU
P29	P29	01: Comp. 1 side 02: Comp. 2 side	16	☼	●	☼	ALT	Comp position detective circuit system error	IPDU
P31	P31	—	47	☼	●	☼	ALT	Other indoor unit error (Group terminal unit error)	Indoor
—	—	—	b7	By alarm device			ALT	Error in indoor group	AI-NET
—	—	—	97	—				AI-NET communication system error	AI-NET
—	—	—	99	—				Duplicated network adaptors	AI-NET

Error detected by TCC-LINK central control device

Check code				Wireless remote controller				Check code name	Judging device
Central control device indication	Outdoor 7-segment display		AI-NET central control display	Sensor block display of receiving unit					
		Auxiliary code		Operation	Timer	Ready	Flash		
C05	—	—	—	—				Sending error in TCC-LINK central control device	TCC-LINK
C06	—	—	—	—				Receiving error in TCC-LINK central control device	TCC-LINK
C12	—	—	—	—				Batch alarm of general-purpose equipment control interface	General-purpose equipment I/F
P30	Differs according to error contents of unit with occurrence of alarm							Group control branching unit error	TCC-LINK
	—	—	(L20 is displayed.)					Duplicated central control addresses	

Terminology

TCC-LINK : TOSHIBA Carrier Communication Link.

New check code

1. Difference between the new check code and the current system

The displaying method of the check code changes in this model and after.

	Check code in current system	New check code
Used characters	Hexadecimal notation, 2 digits	Alphabet + Decimal notation, 2 digits
Characteristics of code classification	Few classification of communication/ incorrect setup system	Many classification of communication/incorrect setup system
Block display	Indoor P.C. board, Outdoor P.C. board, Cycle, Communication	Communication/Incorrect setup (4 ways), Indoor protection, Outdoor protection, Sensor, Compressor protection, etc.

<Display on wired remote controller>

- [⚠] goes on.
- [UNIT No.] + Check code + Operation lamp (Green) flash

<Display on sensor part of wireless remote controller>

- Block display of combination of [⏻] [🕘] [✺]

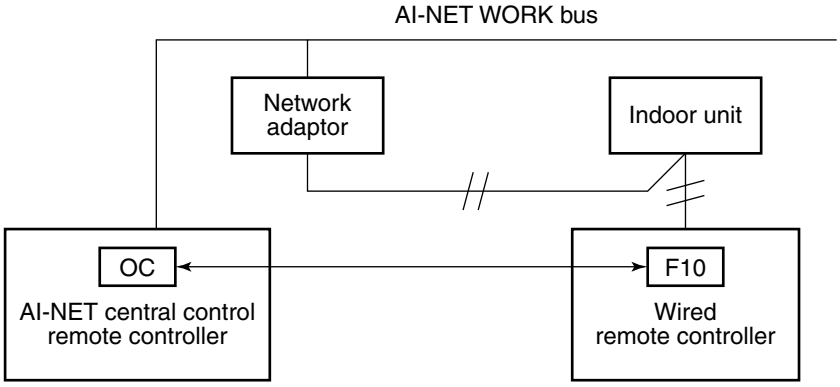
<Display on 7-segment in outdoor unit>

- Unit No. and check code are displayed.
- In a case of error with auxiliary code, check code and sub-code are displayed alternately.

Display	Classification
A	Unused
C	Central control system error
E	Communication system error
F	Each sensor error (Failure)
H	Compressor protective system error
J	Unused
L	Setup error, Other errors
P	Protective device operation

2. Special mention

1) If this model is connected to AI-NET by network adaptor, the different check codes are displayed on the main remote controller (New check code display on new remote controller) and AI-NET central control remote controller (Current system check code display on the current system central control remote controller).
2) The check code is displayed only while the air conditioner is operating (Remote controller start button ON).
   When the air conditioner stops and the error is cleared, the check code display on the remote controller also disappears. However, if the error continues after stop of the operation, the check code is immediately displayed with restarting of the operation.

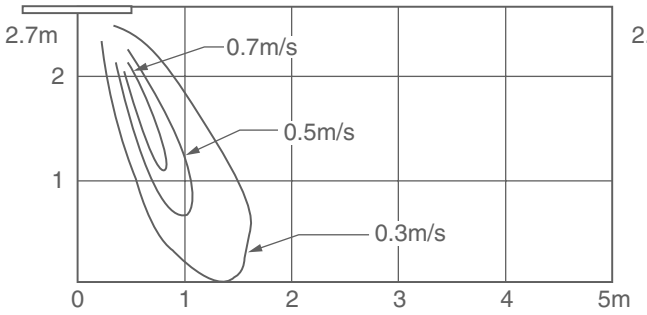


18. AIR SPEED CHARACTERISTICS

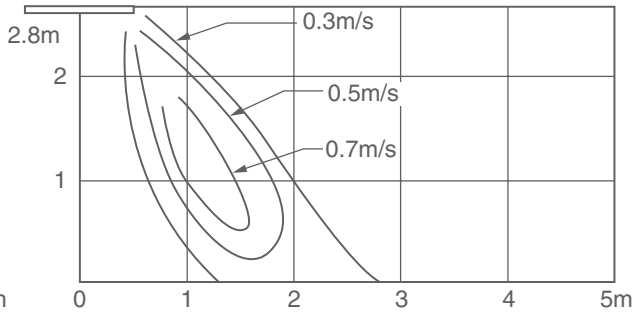
■ Air Speed Distribution

4-way air discharge cassette type

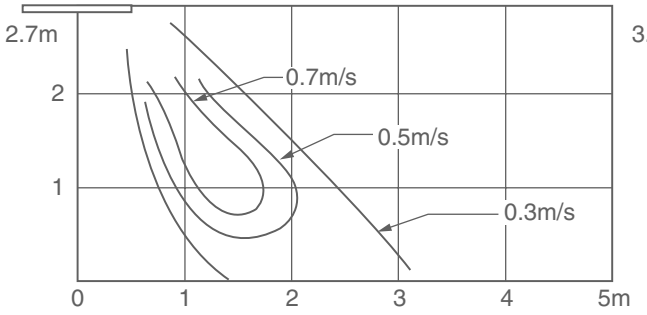
MMU-AP0091H, AP0121H



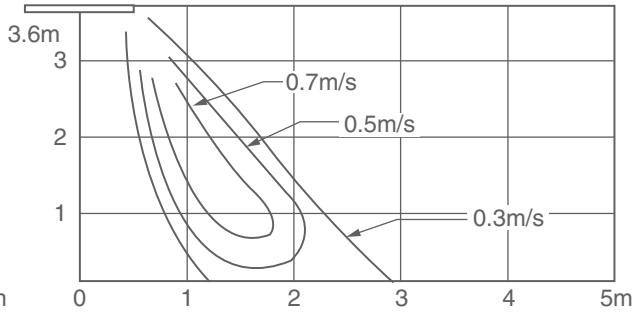
MMU-AP0151H



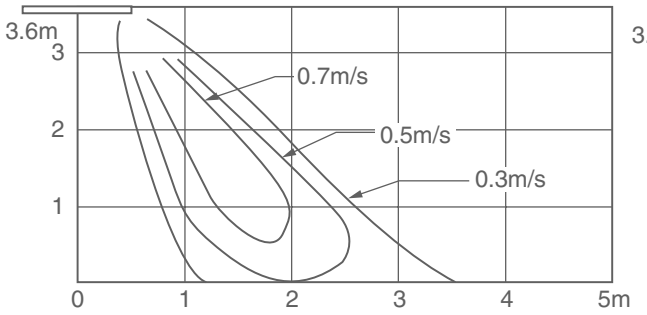
MMU-AP0181H



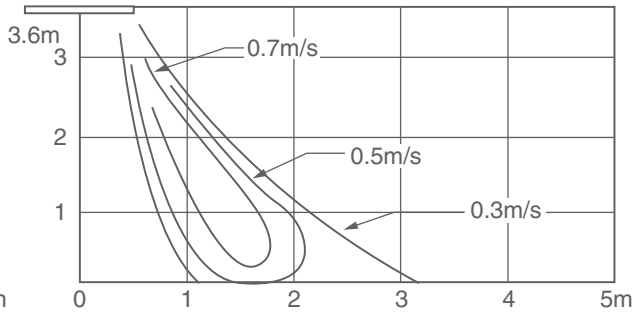
MMU-AP0241H, AP0271H



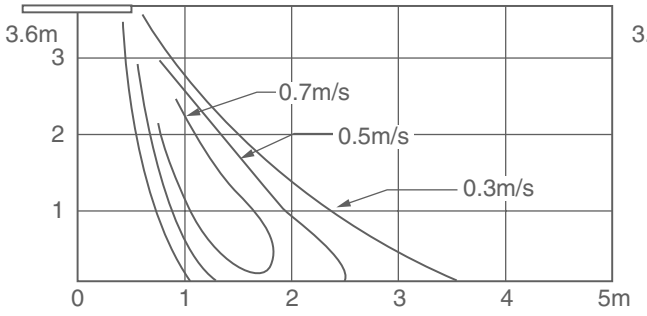
MMU-AP0301H



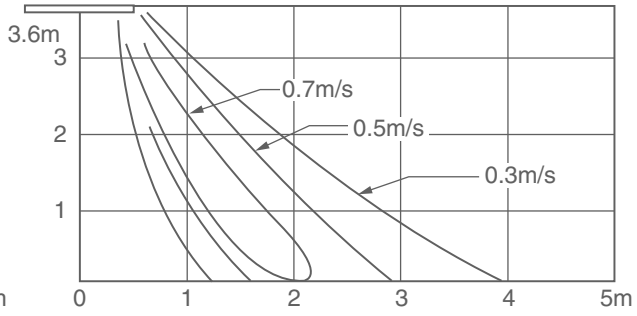
MMU-A0361H



MMU-A0481H



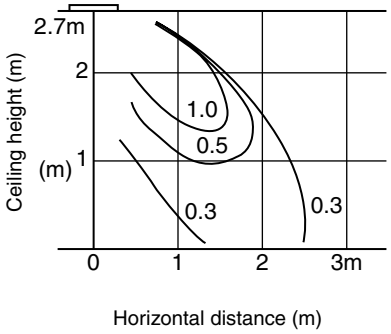
MMU-AP0561H



■ Air Speed Distribution

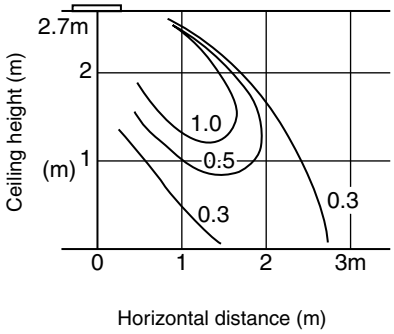
2-way air discharge cassette type

MMU-
AP0071WH, AP0091WH, AP0121WH



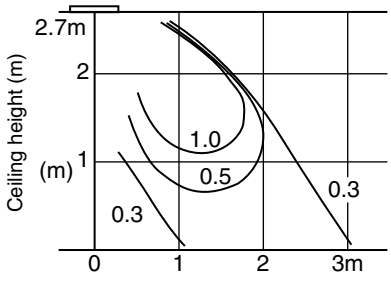
Horizontal distance (m)

MMU-
AP0151WH, AP0181WH



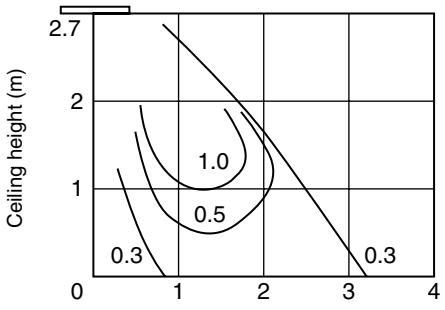
Horizontal distance (m)

MMU-AP0241WH, AP0271WH



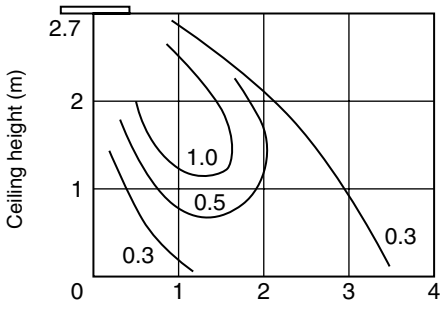
Horizontal distance (m)

MMU-AP0301WH



Horizontal distance (m)

MMU-AP0481WH

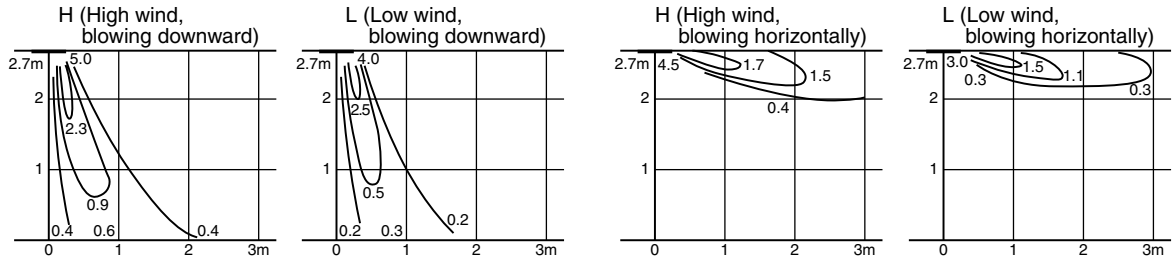


Horizontal distance (m)

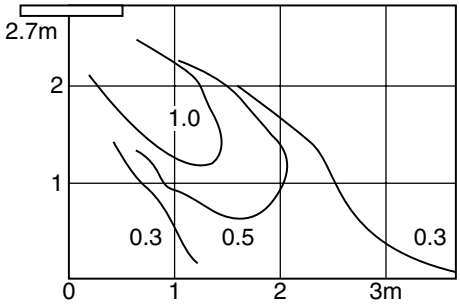
■ Air Speed Distribution

1-way air discharge cassette type

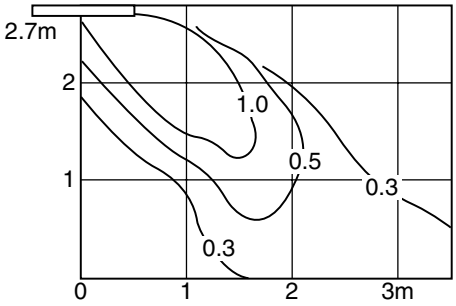
MMU-AP0071YH, AP0091YH, AP0121YH



MMU-AP0151SH,AP0181SH

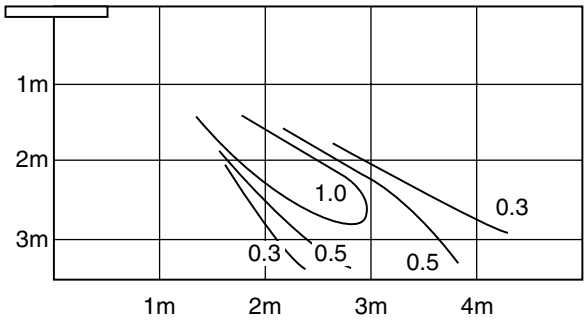


MMU-AP0241SH

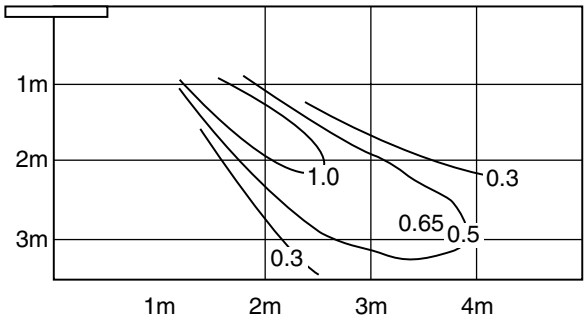


Under ceiling type

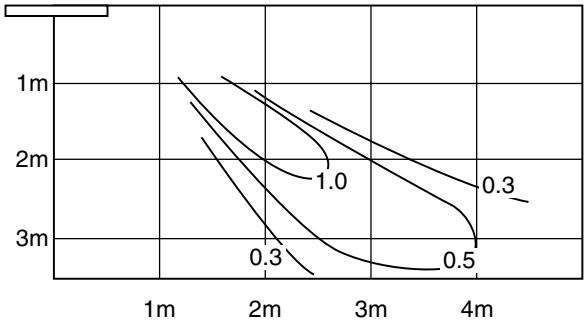
MMC-AP0181H,AP0481H



MMC-AP0361H



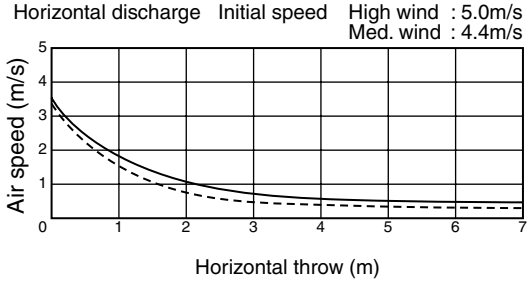
MMC-AP015H,AP0241H,AP0271H



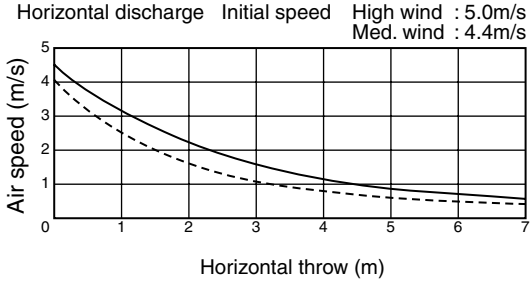
■ Discharge Air Speed and Air Throw

High wall type

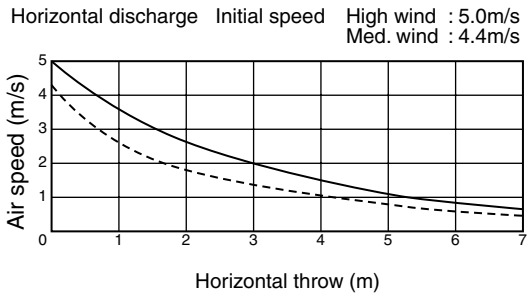
MMK-AP0071H, AP0091H, AP0121H



MMK-AP0151H, AP0181H

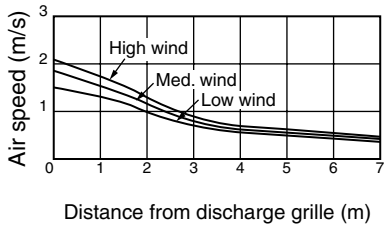


MMK-AP0241H

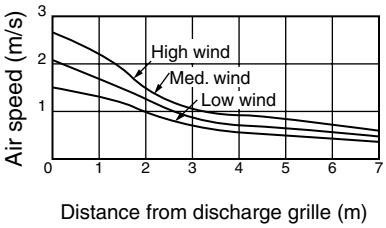


Floor standing cabinet type

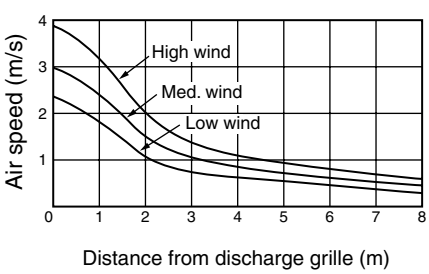
MML-AP0071H, AP0091H



MML-AP0121H, AP0151H



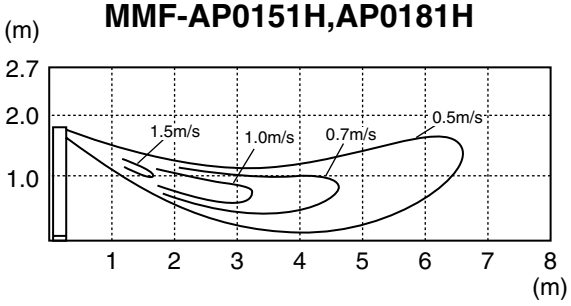
MML-AP0181H, AP0241H



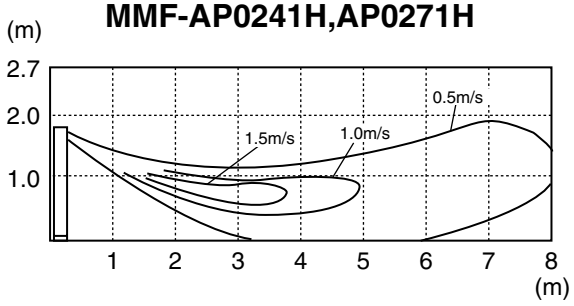
■ Air Speed Distribution and Air Throw

Floor standing type

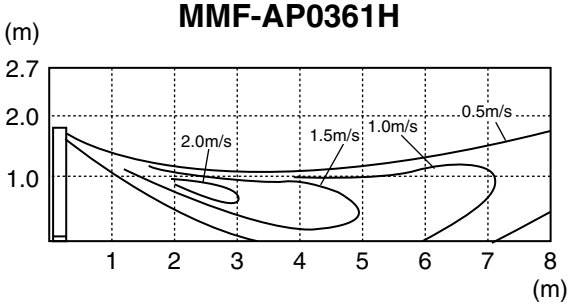
MMF-AP0151H,AP0181H



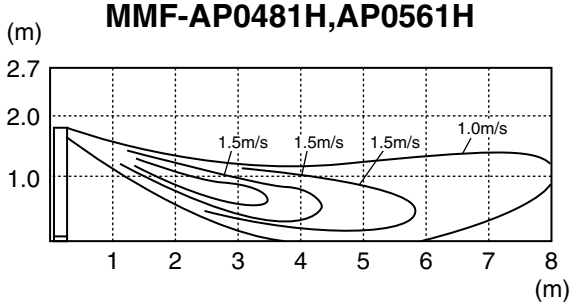
MMF-AP0241H,AP0271H



MMF-AP0361H



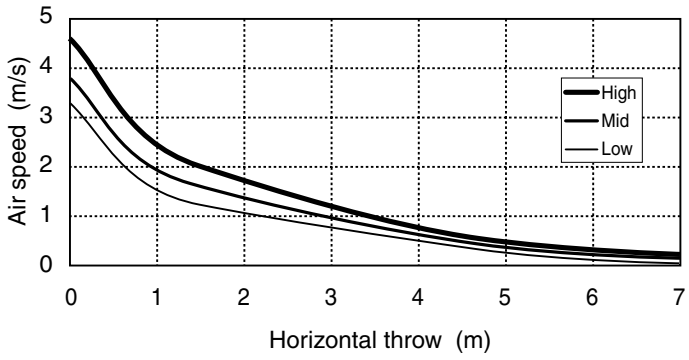
MMF-AP0481H,AP0561H



High wall type (2 series)

MMK-AP0072H, AP0092H, AP0122H

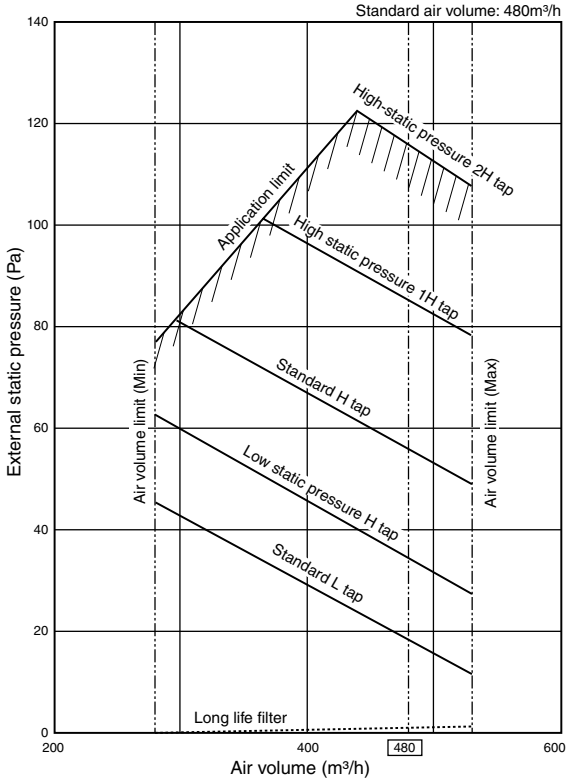
Horizontal discharge Initial speed **High wind : 4.5m/s**
Med wind : 3.7m/s
Low wind : 3.2m/s



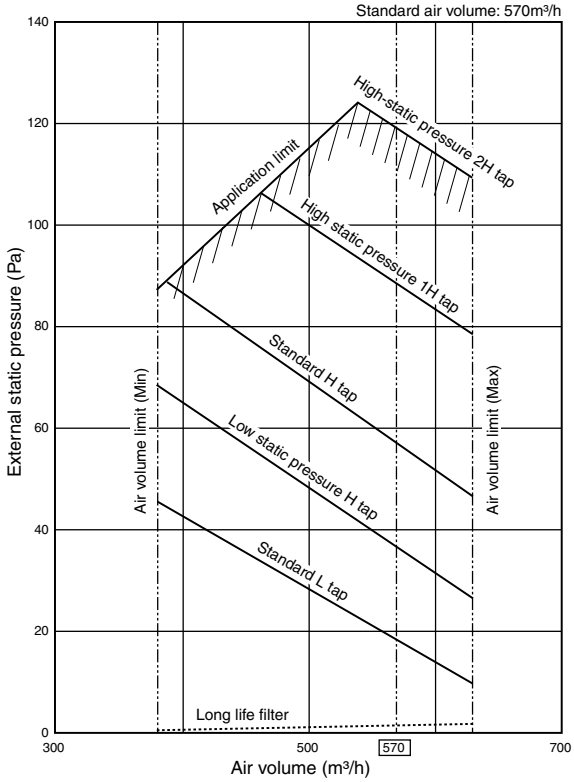
19. FAN CHARACTERISTICS

• Concealed Duct Standard type
In case of square duct flange of discharge section

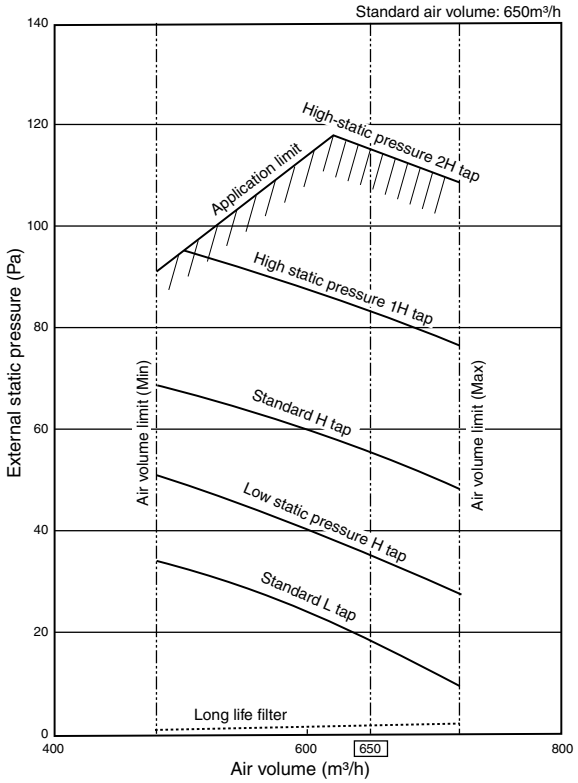
MMD-AP0071BH, AP0091BH



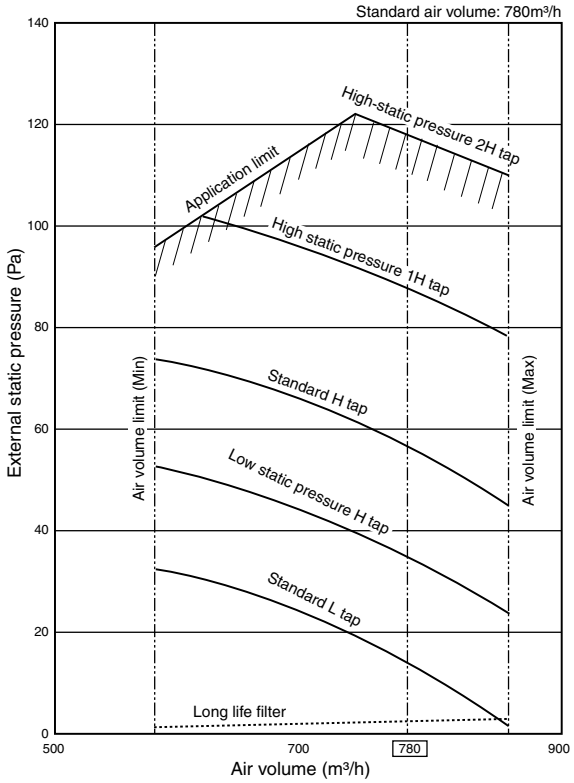
MMD-AP0121BH



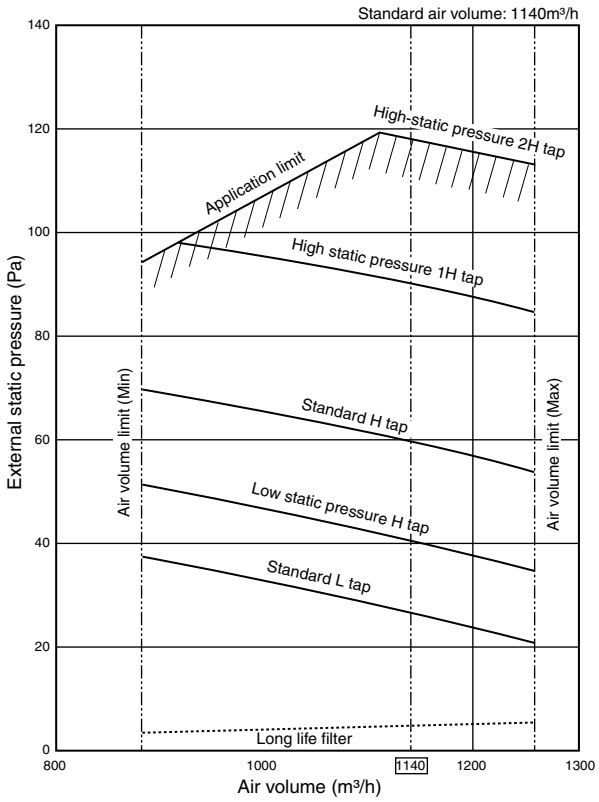
MMD-AP0151BH



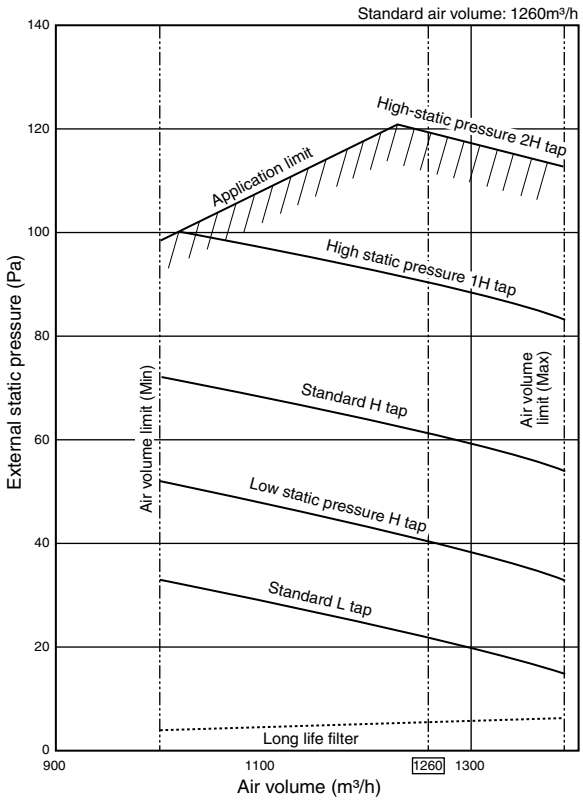
MMD-AP0181BH



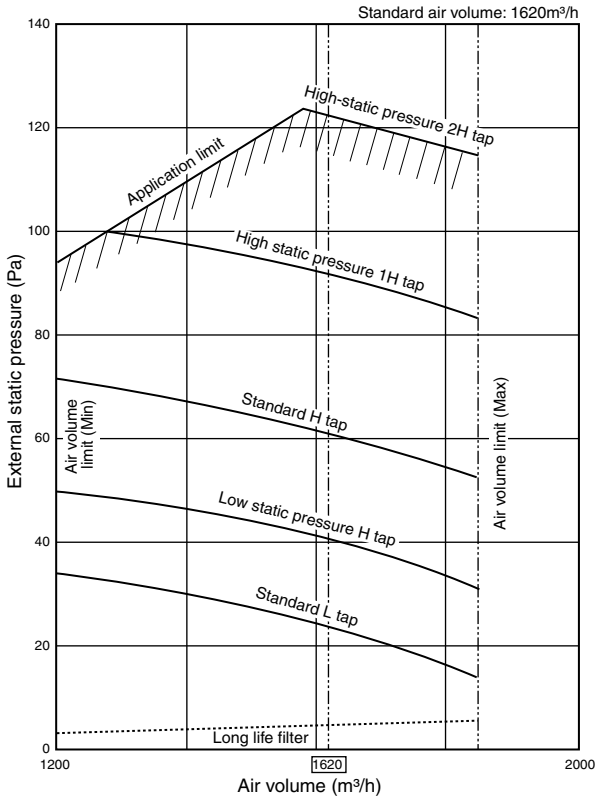
MMD-AP0241BH, AP0271BH



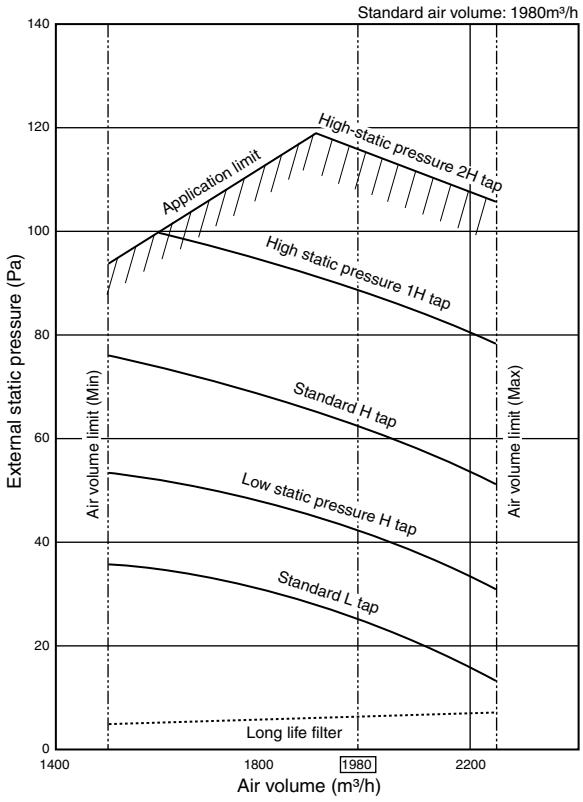
MMD-AP0301BH



MMD-AP0361BH

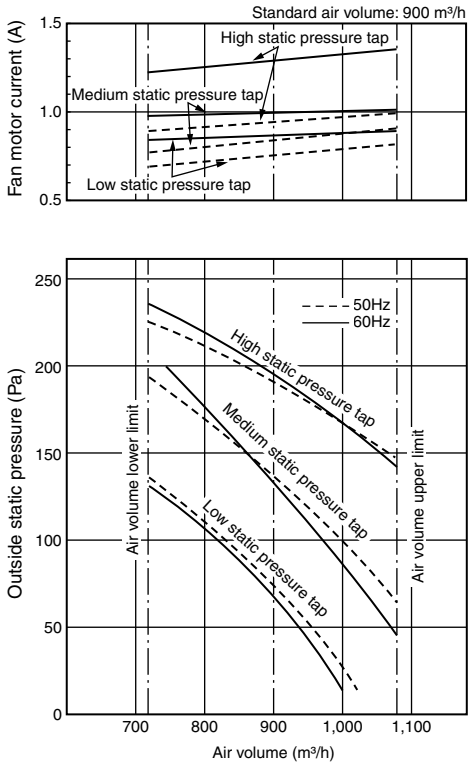


MMD-AP0481BH, AP0561BH

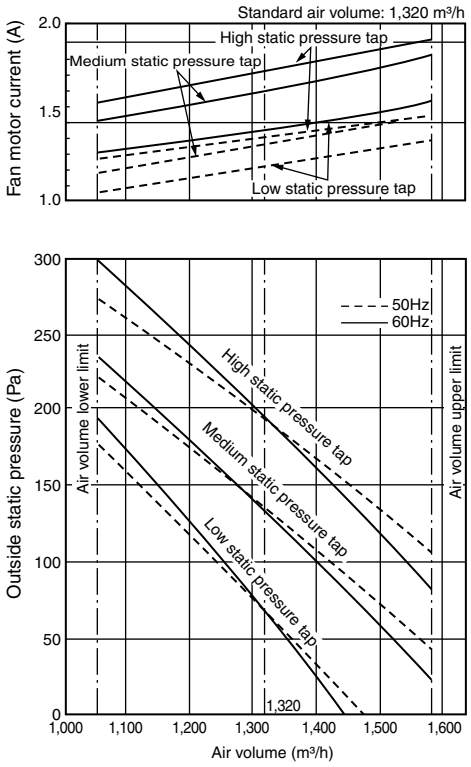


• Concealed Duct High Static Pressure type

MMD-AP0181H



MMD-AP0241H, AP0271H



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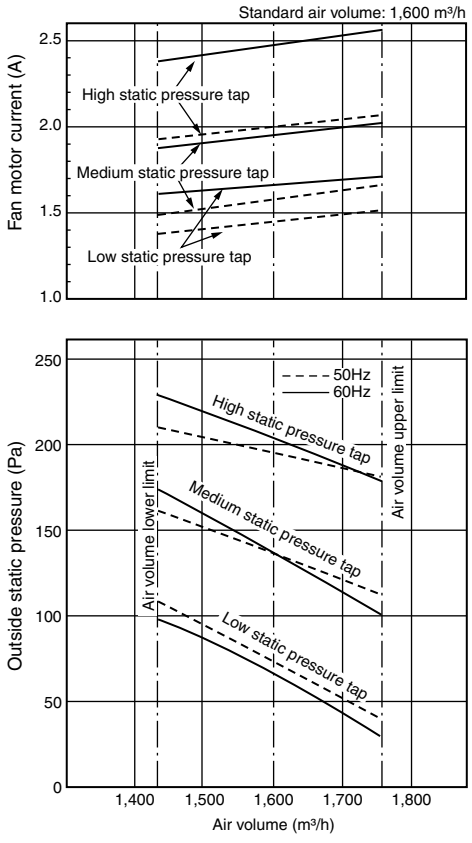
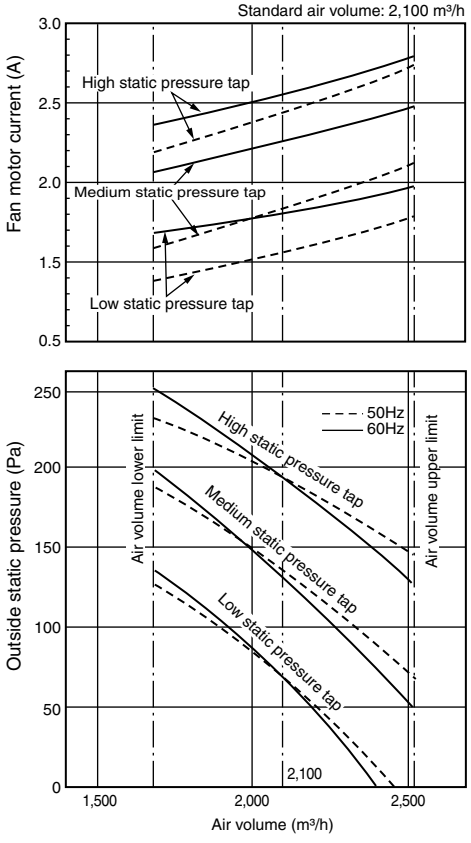


MMD-AP0481H



MEMO

TOSHIBA CARRIER CORPORATION
2 CHOME 12-32, KONAN, MINATOKU, TOKYO, 108-0075, JAPAN